

Promoting mental health in a large and diverse public sector workforce

by

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Declaration of originality

This thesis contains no material which has been accepted for a degree or diploma by the University or any other institution, except by way of background information duly acknowledged in the thesis, and to the best of my knowledge and belief no material previously published or written by any other person except where due acknowledgement is made in the text of the thesis, nor does the thesis contain any material that infringes copyright.

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The research associated with this thesis abides by the international and Australian codes on human and animal experimentation, the guidelines by the Australian Government's Office of the Gene Technology Regulator and the rulings of the Safety Ethics and Institutional Biosafety Committees of the University.

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Statement of authorship

This thesis includes papers for which Lisa Jarman (LJ) was not the sole author.

LJ conceptualised the papers, analysed the data and wrote the manuscripts, and where relevant, participated in data collection. The contributions of LJ and co-authors are detailed below.

1. **The manuscript reported in Chapter 3:**

Jarman L, Martin A, Venn A, Otahal P, Taylor R, Teale, B, and Sanderson K. Prevalence and correlates of psychological distress in a large and diverse public sector workforce: baseline results from Partnering Healthy@Work. BMC Public Health, 14:125, 2014.

The contribution of each author:

LJ conceptualised the article, conducted the data analysis and wrote the manuscript.

AM helped with interpretation of the results and revised the manuscript.

AV helped with interpretation of the results and revised the manuscript.

PO advised on data analysis and interpretation.

RT helped revise the manuscript.

BT helped revise the manuscript.

KS assisted in conceptualising the paper, helped with analyses and interpretation of the results and revised the manuscript.

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2. **The manuscript reported in Chapter 4:**

Jarman L, Venn A, Martin A, Otahal P, Ogle F, and Sanderson K. Trends, costs and correlates of stress-related workers' compensation claims in a public sector workforce. Journal of Health, Safety and Environment, 30(2) 243-258, 2014.

The contribution of each author:

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AV helped with interpretation of the results and revised the manuscript.

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PO advised on data analysis and interpretation.

FO assisted in conceptualising the paper, interpretation of results and also revised the manuscript.

KS helped with interpretation of the results and revised the manuscript.

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Appendix D supplements Chapter 4 and contains a commentary article:

Jarman, L, Martin, A, Venn, A, Ogle, F and Sanderson, K. What can regulatory data really tell us about stress claims?

The contribution of each author:

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AM helped revise the manuscript.

AV helped revise the manuscript.

FO helped revise the manuscript.

KS assisted in conceptualising the paper and revised the manuscript.

3. The manuscript reported in Chapter 5:

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The contribution of each author:

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KS helped with conceptualisation of the paper, interpretation of the results and revised the manuscript.

4. The manuscript reported in Chapter 6:

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PO advised on data analysis and interpretation and revised the manuscript.

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Signed by first-named supervisor, Associate Professor Kristy Sanderson:

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Abstract

Background: Worker mental ill-health has significant repercussions for labour productivity and economic growth, health and welfare systems, community functioning and social equity. Comprehensive workplace health promotion is a popular program framework for whole-of-workforce health intervention but little is known of its effectiveness when this initiative is scaled up in size to target the health of every employee in a workforce.

Aims: This thesis aimed to examine the promotion of mental health in a state public sector workforce in Tasmania, Australia by: i) assessing the prevalence and correlates of poor mental health, ii) identifying trends, costs and correlates of occupational mental diseases; iii) quantifying the effects of a whole-of-workforce workplace health promotion initiative on individual mental health; and iv) measuring whether exposure to workplace health promotion was associated with reduced job-related stress.

Methods: Workforce and population survey data were used to benchmark prevalence and then assess correlates of high psychological distress (Kessler-10) in 2010 (Chapter 3). Occupational diseases and injuries were assessed using de-identified regulatory data provided by WorkCover Tasmania on workers' compensation claims made by Tasmanian Government workers between 2007 and 2012 (Chapter 4). Repeated cross-sectional analyses (2010 and 2013) were used to assess differences in whole-of-workforce psychological distress over time in relation to direct and indirect forms of workplace mental health promotion (Chapter 5). Job stress differences over time as measured by effort-reward imbalance, were also assessed in relation to the availability of and participation in workplace health promotion using repeated cross-sectional analysis (Chapter 6).

Results: Men and younger employees had more prevalent high distress than population norms (Chapter 3). Differences in distress prevalence were observed based on whether data were collected by researchers or the employer. Job stress, as measured by high effort reward imbalance was a key correlate of high distress for men and women (Chapter 3). Trends and costs of stress claims were stable over time, however short-comings in job-stress compensation legislation and

regulatory data were identified (Chapter 4). Participation in programs indirectly targeting mental health was positively associated with women's psychological distress, however increased exposure to workplace health promotion did not effect the observed difference in women's Kessler-10 scores over 3-years (Chapter 5). When results were examined over time, statistical interactions were identified between higher availability of WHP and lower ERI scores for women. Nevertheless, effect modifications were modest for this group and their mean job stress was not statistically lower after 3 years (Chapter 6).

Conclusions: Mental health promotion in Australian workplaces is entering a new phase of evolution due to the introduction of work health and safety legislation that places the onus on employers to monitor and intervene for work-related hazards. These changes highlight the need for, and importance of routine data collection on employee mental health. Better brief surveillance measures and compensation claim data are needed if employers are to meet this challenge. Comprehensive workplace health promotion may offer benefits for mental health and job stress in public sector workforces. However further naturalistic studies examining organisational context and program quality alongside this intervention need to be conducted to clarify the nature of the relationships observed here.

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Table of contents

Declaration of originality	i
Statement of ethical conduct	i
Statement of authority of access.....	ii
Statement of authorship.....	iii
Abstract	vi
Acknowledgements	viii
Table of contents	ix
List of tables	xii
List of figures	xiii
List of abbreviations.....	xiv
Publications	xv
Chapter 1. Introduction	1
1.1 Background	1
1.2 Mental health.....	2
1.3 Work and mental health.....	9
1.4 Effective interventions for workplace mental health.....	18
1.5 Taking a partnership approach for workplace intervention	25
1.6 Thesis aims and research questions	32
1.7 Summary	33
1.8 References	34
Chapter 2. Methods	50
2.1 Preface	50
2.2 Study design	52
2.3 Partnering Healthy@Work Survey.....	53
2.4 Healthy@Work Survey	62
2.5 Population health surveys.....	63
2.6 Other Partnering Healthy@Work documentation and information.....	64
2.7 Workers' compensation dataset.....	64
2.8 Data analysis.....	68
2.9 Ethics	69

2.10	Summary	69
2.11	References	70
Chapter 3. Prevalence and correlates of psychological distress in a large and diverse public sector workforce: baseline results from Partnering Healthy@Work..... 74		
3.1	Preface	74
3.2	Introduction	74
3.3	Method.....	77
3.4	Results	82
3.5	Discussion	90
3.6	Conclusions	94
3.7	Postscript	94
3.8	References	96
Chapter 4. Trends, costs and correlates of stress-related workers' compensation claims in a public sector workforce 100		
4.1	Preface	100
4.2	Introduction	100
4.3	Method.....	102
4.4	Results	106
4.5	Discussion	113
4.6	Conclusions	117
4.7	Postscript	117
4.8	References	119
Chapter 5. Workplace health promotion and mental health..... 123		
5.1	Preface	123
5.2	Introduction	123
5.3	Method.....	125
5.4	Results	130
5.5	Discussion	137
5.6	Conclusions	139
5.7	Postscript	140
5.8	References	141
Chapter 6. Does workplace health promotion contribute to whole-of-workforce job stress reduction?..... 145		
6.1	Preface	145
6.2	Introduction	145

6.3	Method.....	147
6.4	Statistical analysis and methods	150
6.5	Results	151
6.6	Discussion	157
6.7	Conclusions	159
6.8	Postscript	159
6.9	References	160
Chapter 7.	Discussion and Conclusions	167
7.1	Key findings and unique contribution to the literature	167
7.2	Implications of findings	173
7.3	Recommendations for future research	179
7.4	Conclusions.....	181
7.5	References.....	183
Appendix A:	Partnering Healthy@Work surveys 2010 and 2013	188
Appendix B:	Band and occupational coding derivations	230
Appendix C:	Stress-related workers compensation claims: Report 1	232
Appendix D:	What can regulatory data on stress claims really tell us?	266
Appendix E:	Supplementary data	278
Appendix F:	Tasmanian Population Health Survey comparisons 2009 and 2013	283
Appendix G:	InTouch publication	284

List of tables

Table	Page
Table 1-1. Summary of psychosocial hazards in the workplace.	14
Table 2-1. Summary of data sources cited in this thesis.	51
Table 3-1. Data sources to compare employee psychological distress (Kessler 10).	80
Table 3-2. Prevalence (%) of high psychological distress ¹ by age and sex reported in surveys of Tasmanian and Australian employees.	83
Table 3-3. Respondent characteristics for the Partnering Healthy@Work 2010 survey.	85
Table 3-4. Univariable logistic regression analysis.	87
Table 3-5. Sequential log binomial regression models classifying correlates of high psychological distress by sex.	89
Table 4-1. Distribution of workers compensation claims within the Tasmanian State Service during the period 1 July 2007 to 30 June 2011 by type of claim, sex, age, year, leave days, occupation and rate.	107
Table 4-2. Median costs (AUD\$) expressed as constant prices for workers compensation claims commencing during the period from 1 July 2007 to 30 June 2011.	108
Table 4-3. Univariable analysis of associations between demographic variables and stress-related compensation claims for men and women in the Tasmanian State Service during the period 1 July 2007 to 30 June 2011.	113
Table 5-1. Respondent characteristics for the 2010 and 2013 Healthy@Work surveys.	131
Table 5-2. Ratios of mean availability of and participation in Healthy@Work initiatives in 2013 relative to 2010.	132
Table 5-3. Univariable associations between psychological distress (Kessler-10) and respondent characteristics stratified by sex and survey year.	133
Table 5-4. Linear mixed models for all respondents regressing psychological distress (Kessler-10) on survey year and on different types of exposure to Healthy@Work.	135
Table 5-5. Linear mixed models (adjusted) regressing psychological distress (Kessler-10) on survey year and on different types of exposure to Healthy@Work for the cohort of repeat survey responders (n=580).	136
Table 6-1. Univariable associations between job stress (Effort-Reward Imbalance) and respondent characteristics stratified by sex and survey year.	153
Table 6-2. Linear mixed models regressing Effort Reward Imbalance and its scales on exposure to Workplace Health Promotion.	154
Table 6-3. Linear mixed models for the cohort group regressing Effort Reward Imbalance and its scales on exposure to Workplace Health Promotion.	155
Table E-1: Price indices applied to convert workers compensation claim payments to constant prices between 2007 and 2011.	279
Table E-2: Log binomial regression models of demographic variables associated with stress-related compensation claims for men and women in the Tasmanian State Service during the period 1 July 2007 to 30 June 2011	280
Table E-3. Comparisons of respondents and non-respondents for Partnering Healthy@Work surveys in 2010 and 2013 by age, tenure, employment condition and employment category, stratified by sex.	281
Table F-1. Mean Kessler-10 scores by sex for Tasmanians aged 18 years and over who were employed for wages in 2009 and 2013.	283

List of figures

Figure	Page
Figure 1-1. Determinants of worker mental health and their business and societal effects.	10
Figure 2-1. Flowchart showing sampling and responses to the Partnering Healthy@Work surveys as at November 2014.	55
Figure 4-1. Predicted rates of compensation claims per year per 1000 male employees of the Tasmanian State Service stratified by age-group, during the period from 1 July 2007 to 30 June 2011.	109
Figure 4-2. Predicted rates of compensation claims per year per 1000 female employees of the Tasmanian State Service stratified by age-group, during the period from 1 July 2007 to 30 June 2011.	110
Figure 4-3. Median cost per workers compensation claim expressed as constant prices by financial year for Tasmanian State Service employees during the period 1 July 2007 to 30 June 2011.	112
Figure 6-1. The range of available Healthy@Work initiatives in 2010 and 2013 reported by respondents in 2010 and 2013.	152
Figure E-1. Percentages of respondents reporting availability of Healthy@Work initiatives in 2010 and 2013.	278
Figure E-2. Mean numbers of available Workplace Health Promotion initiatives per department reported through Tasmanian Government audits between 2009 and 2012.	282

List of abbreviations

ABS	Australian Bureau of Statistics
BMI	Body mass index
CBT	Cognitive behavioural therapy
CI	Confidence interval
CMD	Common Mental Disorder
ERI	Effort-reward imbalance
ICF	International Classification of Functional Disability and Health
JDC	Job demand-control
K10	Kessler 10 Psychological Distress Scale
NDS	National dataset for compensation-based statistics
NHMRC	National Health and Medical Research Council
NSMHWB	2007 National Survey of Mental Health and Wellbeing
OECD	Organisation for Economic Cooperation and Development
PR	Prevalence ratio
ROC	Receiver operator characteristic
RR	Risk ratio
SD	Standard deviation
SE	Standard error
SF	Short Form Health Survey
TPSM	Theory of preventive stress management
WACA	Workforce Analysis and Collection Application
WHO	World Health Organisation
WHP	Workplace health promotion
WHS	Work health and safety

Publications

Publications directly arising from the work described in this thesis

The publishers of the papers comprising Chapters 3 to 6 and Appendix C, hold the copyright for that content, and access to the material should be sought from the respective journals and organisations. The remaining non published content of the thesis may be made available for loan and limited copying and communication in accordance with the Copyright Act 1968.

Chapter 3:

Jarman L, Martin A, Venn A, Otahal P, Taylor R, Teale, B, and Sanderson K. Prevalence and correlates of psychological distress in a large and diverse public sector workforce: baseline results from Partnering Healthy@Work. BMC Public Health, 14:125, 2014.

Chapter 4:

Jarman L, Venn A, Martin A, Otahal P, Ogle F, and Sanderson K. Trends, costs and correlates of stress-related workers' compensation claims in a public sector workforce. Journal of Health, Safety and Environment, 30(2) 243-258, 2014.

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Chapter 6:

Jarman L, Venn A, Martin, A., Otahal P, and Sanderson K. Does workplace health promotion contribute to job stress reduction?. Submitted to BMC Public Health on 8 September 2015.

Other publications linked to partnering Healthy@Work

Appendix C:

Jarman L, Venn A, Martin A, Otahal P, Ogle F, and Sanderson K. Stress-related workers compensation claims in the Tasmanian State Service 2007-2011: Report 1, November 2012.

Appendix G:

Jarman L, Martin A, Venn A, and Sanderson K. Mental health in the workplace: partnerships in practice. In Touch newsletter publication of the Australian Public Health Association Inc, September/ October 2012.

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Chapter 1. Introduction

This chapter provides a broad overview to the thesis topic, which examines the promotion of mental health occurring in conjunction with the implementation of comprehensive workplace health promotion in a large and diverse public sector workforce. In order to situate the overall research aims of this thesis, the first chapter reviews key literature on worker mental health, workplace health promotion and relevant research-industry partnerships for relevant intervention evaluations. More specific reviews of relevant literature are provided in Chapters 3 to 6.

1.1 Background

Mental health and well-being are central to our ability as individuals to think, feel and behave, to interact with others and to make a living. Mental illness can interfere with our work capacity, thus leading to social and financial disadvantage (1). Mental disorders account for 7.4% of the world's measured health burden and are now the major cause of work absenteeism and work disability in many developed countries (2).

With 65% of all adults worldwide being employed (3), the workplace is a natural access point for prevention strategies and intervention actions targeting mental ill-health. Worker mental illness has significant repercussions for labour productivity and economic growth (4), health and welfare systems, community functioning and societal equity (5) with their costs estimated to amount to \$16 trillion over the two decades 2012-2032 (4).

Workplace health promotion programs have had a surge in popularity that can be attributed to their capacity to i) simultaneously address a range of health-risk factors that may impact health, wellbeing and productivity, ii) show economic viability for employers and iii) be easily assimilated into work settings (6).

Comprehensive workplace health promotion (WHP) is a programme framework for health intervention that may be suited to addressing issues contributing to the mental disease burden. It considers mental and physical health as well as the

need to make work structures supportive of health-promoting choices (7). As such this framework can include strategies to enable access to quality mental health services, eliminate stigma associated with mental illness, address mental health literacy and overcome exploitation (8). It has been advocated as a best-practice model in North America since the early 2000s (7) and has transitioned to global workplaces more recently (9). However, there is presently only preliminary evidence in favour of a connection between comprehensive WHP and mental health (6,10) with little known about its effectiveness, particularly when this initiative is scaled up in size to target the health of every employee in a workforce (11). (Note: this thesis uses the terms ‘whole-of-workforce scale’ or ‘at-scale’ to describe this scope).

When considered from a public health perspective, small differences in mental health across a whole population can be highly informative for policy development (12), especially considering that global responses to the mental illness burden are urgently needed (8). Key populations of international interest are public sector (government) workers because research has shown mental health problems, including job stress are more prevalent in this large population of employees than in the private sector (13,14). This thesis will examine the prevalence and correlates of mental ill-health in a public sector workforce, and differences in employee psychological and job distress after a period of universal WHP. The research was conducted through a whole-of-workforce, or population surveillance method that aligned with the implementation of a comprehensive WHP strategy called ‘Healthy@Work’. Healthy@Work aimed to universally improve health within a large and diverse public sector workforce between 2009 and 2012. The thesis will address the descriptive epidemiology, prevalence and correlates, of mental ill-health and disease within the workforce, and will examine differences in employee mental health and job stress between 2010 and 2013.

1.2 Mental health

This section defines and categorises mental health and illness, and gives an overview of what is currently known about its epidemiology. As such it

provides a general overview of the burden of mental disease and why work settings are important locations for the promotion of mental health.

1.2.1 Defining and categorising mental health and illness

The World Health Organisation (WHO) defines mental health as

“a state of well-being in which every individual realises his or her own potential, can cope with the normal strains of life, can work productively and fruitfully, and is able to make a contribution to her or his community”(15).

In contrast, mental illness can be conceived as

“suffering, disability or mortality due to mental, neurological and substance use disorders, which can arise due to the genetic, biological and psychological makeup of individuals as well as adverse social conditions and environmental factors” (16).

The terms ‘mental ill-health’, ‘poor mental health’ and ‘mental health problems’ are sometimes used interchangeably in this thesis. Whenever the terms ‘mental disorder’ or ‘mental disease’ are used they are referring to the mental illness definition. Mental illness is ‘non-communicable’; it is not transmissible or infectious but is often a life-long health burden (16). Individuals can frequently experience mental ill-health at a sub-clinical threshold which can be defined as ‘psychological distress’ (17). The main focus of this thesis is on mental ill-health and so encompasses conditions of psychological distress as well as mental diseases.

It is important to discriminate between mental disorder and disability. Mental disorder does not infer incapacity to work. Rather, it implies impaired functioning that is expressed through behaviour or psychology. Effective interventions exist for most mental disorders and at least some recovery is usually possible (18,19). In contrast, disability is a term used where long-term work incapacity is inferred (20). The International Classification of Functioning, Disability and Health (ICF) categorises disability as an overarching term describing i) impairment (issues with body structure or functioning), ii) activity limitations (problems with executing tasks) and iii) participation restriction (issues limiting involvement in normal life activities) (21). Therefore mental

disorders can lead to work disability, but 60 to 70% of people experiencing mental ill-health at work are capable of ongoing employment.

Around three-quarters of people diagnosed with mental disorders each year experience mild or moderate forms, which are generally called ‘common mental disorders’ (CMD) (22). These conditions typically include anxiety conditions (involving feelings of distress, nervousness or tension), mood disorders (changes in affect, including depression) and substance abuse. Most people who experience CMD continue to work (23,24). Serious mental illnesses such as schizophrenia, which are far more disabling in terms of an individual’s capacity to work, are fairly rare (lifetime risk has been estimated at 4 cases per 1000 people) (25). Therefore, as the focus of this thesis is upon adult workers, it seems likely that this research will capture data that mainly overlaps with indicators of CMD.

1.2.2 Epidemiology of mental illness

Burden of disease

The prevalence of mental illness has become much clearer in the past 20 years (26-28). Recent general population estimates suggest that mental illness represents 7.4% of the world’s measurable burden of disease (2). A comprehensive meta-analysis based on 174 large-scale mental health surveys across 63 countries calculated that CMD was experienced by 18% of adults within the past 12 months and 30% of adults over their lifetime (29). Although variations were observed by region according to the level of development and language spoken, this study highlighted the pervasiveness of CMD worldwide. Approximately two-thirds of people with a CMD are employed whereas this proportion drops to around 50% for those with serious mental illnesses (30). That is, workplace prevalence estimates are similar to those in the general population. Australian research has calculated that ~20% of workers experienced a mental disorder in any given year and 15% of workers had experienced major depressive disorder within their lifetime (31). There are also sex-based differences in the way men and women report mental disorders. Men report higher rates of substance use and antisocial disorders whereas women report

higher rates of anxiety and mood disorders (32). The scale of these problems has prompted global action to find solutions to the burden of mental disease (33).

Global health is in a period of change that is being driven by an ageing and growing human population, shifts in leading causes of death and transitions towards disability as a key burden of disease (2). As a result, the status of non-communicable diseases and injuries has risen in priority with mental disorders and associated diseases, such as musculoskeletal disorders, now accounting for 22.7% of all years lived with a disability (34). While the prevalence of mental illness does not appear to be increasing among the general population (35), the number of working days lost to mental ill-health and the prevalence of work disability associated with mental illness have been rising within developed countries (23).

Australian data have shown that a one-standard-deviation deterioration in the Short-Form Health Survey (SF-36) mental health scale equates to a 30% reduction in employment capacity (36). Commonly experienced conditions, such as depression (37), can impair work functioning and social interactions on a recurring basis (38). Indeed, depression has been found to make a larger contribution to individual performance at work than other health conditions (39). As workers experiencing depression are also more likely to continue working while unwell than those with other illnesses (40,41) the health and economic burdens (which are primarily assumed by employers) for depression alone are considerable (42-44). These types of productivity-related issues have been a strong incentive for employers to take notice of the costs and causes of mental ill-health.

Estimates of financial burdens are large due to the number of people who are at work and who also experience CMD. In Australia, economic losses associated with mental ill-health amount to almost AU\$11 billion per year. Of this figure, 'absenteeism' (taking paid sick leave) accounts for about AU\$4.6 billion, 'presenteeism' (working while feeling unwell) equates to around AU\$6.1 billion, and 'workers' compensation' (medical insurance for injured or unwell employees) amounts to approximately AU\$146 million per annum (45). Data from the Organisation for Economic Cooperation and Development (OECD) indicates that mental ill-health among workers accounts for approximately 4% of

the gross domestic product of European countries (23). The economic burden due to mental diseases has been calculated as greater than that due to other major non-communicable diseases such as diabetes, cardiovascular disease (CVD), cancer and chronic respiratory diseases (4).

These economic and productivity losses suggest that although monitoring of sick leave and expediting return to work is important, earlier intervention is critical to make headway in relation to the financial burden of mental disease. Employers are now seeking workplace interventions that are effective in promoting employee mental health (1). A recent meta-analysis has estimated that preventive interventions decreased incidence of major depressive disorders by more than 20% (18).

It is also important to consider that observed rises in the prevalence of work disability related to mental disease may be associated with secular trends and regulatory factors. The public profile of mental ill-health and social recognition of psychological distress have increased in recent decades. For example, decreases in the stigma associated with self-reporting mental states and increased expectations of work conditions may have led to higher reporting of mental disease (46). Modern working environments have also made an important contribution and are discussed later in this chapter.

Contrary to expectation, the mechanisms for worker protection from injury and illness may also be making a contribution to increased reports of disability for mental diseases. A meta-analysis of cohort studies found that people entering compensation processes reported worse mental health than non-claimants. Compensation processes were also less effective in addressing mental health with claimants having poorer recovery than non-claimants (47). These processes have been identified as litigious and can disadvantage minority groups (48).

Furthermore, the timeframes involved in the resolution of musculoskeletal and stress-related workers' compensation processes have been found to far exceed those of other occupational diseases (49). Australian research has indicated that compensation claimants were 50% less likely to ever return to work when they experienced more than 45 days off work due to injury (50). Between 2000 and 2013 the median number of days lost for stress-related compensation claims in

Australia increased by 27%, rising from 11.2 to 14.2 weeks (49). These factors suggest that injury and illness claimants may be susceptible to poor mental health, whether due to work or other factors, and may have this condition exacerbated when seeking compensation. If we are to influence disability rates for mental disease greater clarity is needed around the contribution made by compensation processes as separate to the characteristics of those submitting claims and the occupational hazards contributing to disease.

Recent global statistics show that rates of younger workers now claiming disability benefits associated with mental illness have increased (20). This situation means the cost of disability benefits is rising because an increasing number of people are accessing these benefits and they are being paid for longer periods. In Australia the incidence of occupational mental disease claims is also increasing, but these claims are still mainly made by older workers (51). While the downstream cost and health implications for governments and society seem self-evident for work disability, pinpointing upstream indicators describing the pathway between mental ill-health and work disability remains a challenge.

In summary, the burden of mental ill-health has major implications for individuals, employers and society. Interventions that effectively promote mental health among workers are urgently needed.

Characteristics of mental ill-health

Accurately assessing the burden of mental ill-health in employment presents particular challenges because the illness is frequently a covert disorder, which may not be recognized by the individual whom it affects, or because of poor health-literacy among friends, family or work colleagues (52). Where mental ill-health is recognized it may not be disclosed due to associated stigma, and the inability to obtain or retain work (53,54). Furthermore, if it is made known to others, there may be insufficient capacity or willingness among those involved to address the issue (54). Organisations with poor mechanisms for disclosure of depression have been found to have higher levels of stigma than those with clear strategies to address mental ill-health (55). Broad-reaching interventions that affect all levels of organisations are needed to reduce stigma, thereby promoting disclosure and enabling supportive responses (56,57). Therefore, measuring the

presence of mental ill-health among workers, identifying its causes and determining workplace responses is highly important if we are to make inroads on mental health. However these tasks are also highly complex and require consideration of a broad range of inter-related factors (Figure 1-1).

The onset of mental ill-health typically begins early in life, with 50% of disorders estimated to commence in childhood and adolescence (27). Risk factors for mental disorders during childhood include genetic predisposition, pregnancy and birth-related conditions, adverse and abusive childhood experiences, parental mental ill-health and unemployment. In adulthood, risk of poor mental health is increased by unemployment, inadequate income and housing, stressful life events, violence and other hardships (58). Within workplaces, risk of mental ill-health is higher among women (59), certain occupational groups (such as ‘service’ and ‘white-collar’ workers) (60), and those with lower socio-economic status (61). Despite the differences in the way that men and women report mental ill-health, men may experience on-the-job stressors more keenly than women because work is a key gender-role for men (59). Work circumstances causing distress can in turn provoke the onset of mental disorders (62) and these are discussed later in this chapter. New determinants of health are also emerging largely due to changes in labour markets, political and social systems, economic globalization (63,64) and technology (65). The effects of these factors on modern work are explored in more detail in section 1.3.

Many of the factors listed above are adverse social circumstances that appear to trigger stress-related physiological systems. Researchers have posited that this type of stress arousal is important for social adaptation and learning of new behaviours (66). Acute stress responses can be helpful by increasing human arousal, enhancing attention and giving motivation for behavioural change in the face of environmental stressors. However extended exposure to situations stimulating stress responses can lead to chronic arousal that initiates physiological change, such as increased blood pressure and decreased immune function, and contributes to chronic problems such as cardiovascular disease and diabetes (67). Chronic stress also seems to dysregulate the brain’s hypothalamic-pituitary-adrenal axis, which has been associated with onset of

mental illness (68). Those who experience worse effects seem unable to avoid chronic exposure to adverse conditions. Therefore perceived ‘control’ is a critical factor in the arousal pathway (69). Stress arousal mechanisms provide strong evidence supporting the view that mental health has social determinants. People who experience socio-economic disadvantage are more likely to be exposed to chronic forms of stress arousal and thus seem more prone to mental health problems (58,70).

Mental ill-health is also linked to risk-related coping behaviours such as alcohol and drug misuse, physical inactivity, poor nutrition, obesity and smoking (71) and it is frequently present alongside physical disease (72). Mental and physical diseases are closely inter-related and causality can be reciprocal. For example, pain-related conditions are strongly influenced by mental factors (23) and around half of those who experience depression are also likely to report physical disease (73). For this reason, modern clinical training on treatment of mental disorders includes a focus on targeting mental and physical factors (74).

Mental illness can be effectively treated, with symptoms reduced and stabilized (19) however some common conditions, such as depression, are prone to relapse over the life-course (75). This means that workplace-based prevention strategies as well as effective treatment are needed if we are to be successful in reducing the overall health burden of mental diseases.

1.3 Work and mental health

This section defines work and its relationship with employee mental health. It also considers how workplace factors can contribute to employee stress arousal, gives an overview of the key models explaining these pathways, and describes the health effects of chronic job-related distress. While job-stress models provide critical information, it is always important to place them in the larger context of factors contributing to worker mental health. Stress arousal is a process rather than a health outcome.

1.3.1 What is work?

In this thesis, work is conceived as physical or mental efforts applied by people in exchange for pay. As noted in the previous section, there is a reciprocal

relationship between work and health. Work can provide a setting that can have both positive and negative effects on mental health. An overview of the interactions between work and mental health that summarises the literature reviewed in this thesis is shown in Figure 1-1.

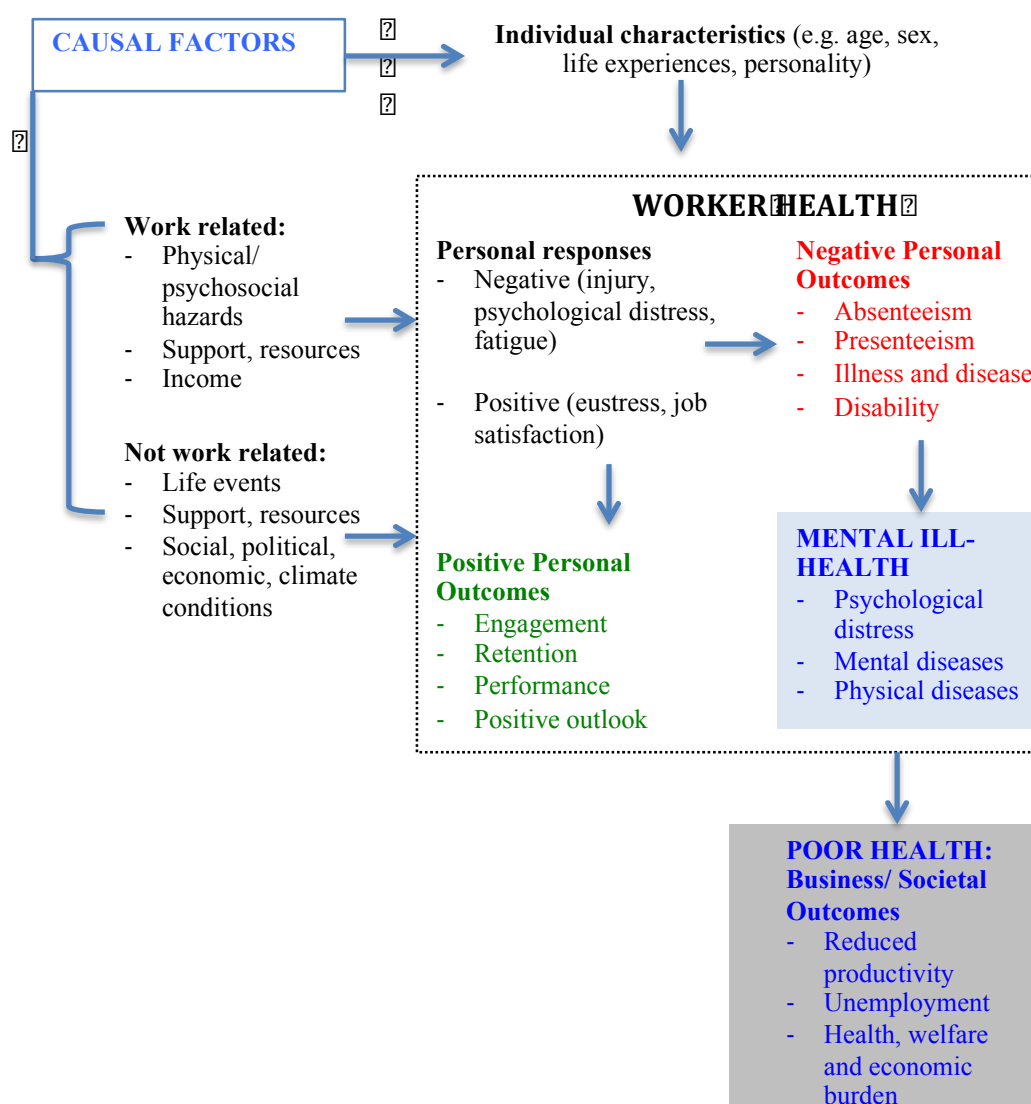


Figure 1-1. Determinants of worker mental health and their business and societal effects.

1.3.2 Determinants of worker mental health

Work can provide a source of regular income, social support and status, identity, purpose, self-esteem and daily structure. Work can enable physical and mental health through the lifespan via benefits and protections such as income security,

superannuation for retirement, paid sick and personal leave, holidays, health insurance, child care facilities, access to training and education, and workplace-based health promotion programmes. It allows people to make healthier choices about where and how they live and what they do with their non-work time. As such work facilitates social advantages and thus aids social inclusion [76].

While mental health is benefitted by employment, the quality of work [77] and its structure [65] are also key considerations. There is substantial research evidence supporting links between exposure to work stressors that can catalyse job-related distress, and subsequently lead to deteriorations in physical and mental health [e.g. [78-83]]. These work stressors can include: i) the way work is organised, including processes of change; ii) job-related psychosocial risks (e.g. workload, schedules, support); iii) production methods (e.g. pay incentives schemes, the pace of work, processes); and iv) insecure work or unfair decision making [84]. Some forms of modern work appear to have exacerbated work stressors by exposing workers to adverse circumstances while reducing job control. A recent systematic review of published studies, mainly drawn from European countries, has suggested that work stressors may be experienced differently by sex. Women were found more likely to report job insecurity, poorer work conditions, and lower control whereas men reported more demanding work, less support and worked longer hours [85].

Employment conditions, which refer to the arrangements made between ‘buyers’ (employers) and ‘sellers’ (employees) of labour, have changed considerably over the past 30 years. Many prominent work and health researchers have attributed these changes to the rise of Neo-liberalism during this time [64, 84, 86, 87].

Neo-liberalism is a commercial market philosophy focused upon economic profit through concepts such as free trade and reduced government spending. Its business and political popularity in developed nations has advanced economic globalisation but has also changed the nature of work considerably. As a result work regulation systems such as legislated rates of pay, collective bargaining, and unionism have declined globally. These elements have been replaced by market-driven fixed-wage systems that have contributed to growing disparity in wage rates across economies [86]. This process has contributed to a power imbalance between employers and employees that now favours employers. It

has enabled the introduction of more flexible forms of work for employers to enhance productivity, but deregulation has also increased job insecurity through higher precarious and contingent forms of work [86, 88].

In the same period, technological advances and increased focus on economic productivity have led to global changes in public sector work (privatisation, downsizing, outsourcing) [89], emergence of new occupations and streamlined forms of production [65]. As a result many authors argue that work has intensified (higher workloads as well as shorter deadlines) [63, 64] and has become more focused upon a 'service' economy [65]. These changes have increased the amount of mental effort within jobs [90]. Traditional boundaries between work and home-life have also deteriorated due to constant technological access [91]. Apart from what is already known about psychosocial factors linked with job stress, recent commentaries have suggested that these macro-level changes are emerging social determinants of health that contribute to, and sustain health inequalities [64, 65, 92].

Concerns about these issues are gaining impetus for a number of reasons. First, with increased life expectancy and an ageing population, concepts around careers and retirement are changing. Workforces are becoming more reliant upon older workers [93]. A key question facing employers and policy makers is how to keep older workers healthy and employed in the longer term. Poor mental and physical health has traditionally been associated with early retirement or a transition to disability benefits [94]. Second, to remain competitive in the face of economic globalisation, workforces need to maximize employee productivity. This can only be achieved if workers stay physically and mentally healthy and are motivated to work. Therefore it is in employers' interests to implement effective workplace health promotion strategies. Third, as the world's population ages, tax-based funding available from workers will decline, and government income will be spread across a greater range of issues. Factors contributing to preventable cost burdens, such as work disability will come under greater scrutiny in the future. In the face of these changes, people will need to be better equipped to look after their health. This means that healthy choices and behaviours need to be encouraged among workers and employers need to help prevent upstream risks wherever possible.

1.3.3 Job-related distress (job stress): concepts and determinants

There are beneficial forms of job stress, which are sometimes referred to as ‘eustress’, and are related to increased motivation and work engagement among workers [95]. Individual characteristics, work and non-work environments all play a role in mediating vulnerability to job stress [96]. Recent commentary has emphasized that work can be designed to be meaningful, to create positive working cultures and employee engagement, and to foster social capital and genuinely supportive leadership. Furthermore, it can be used as a setting to build individual capacities promoting resilience in the face of life stressors and thus prevent mental ill-health [97]. However, as the focus of this thesis is upon mental ill-health, it is important to distinguish psychological distress (mental ill-health at a sub-clinical threshold with a broad set of causes) from job-related distress (a harmful reaction in response to work-related factors). Job-related distress is described in more detail in the next two sections. In this thesis job-related distress will be referred to as ‘job stress’ and defined as

“the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker. Job stress can lead to poor health and even injury” [98].

Work adds another layer of complexity to the relationships between individual contributions (e.g. genetics, life experiences) and environmental factors (social conditions, technology, economic globalization) and mental health. Employment can be of benefit, but as noted earlier, there are a number of ways of organising, managing and producing work that can either individually contribute to, or interact with existing individual and environmental circumstances to cause mental and physical ill-health and lead to chronic poor health [99] (Table 1-1 contains a summary of work-related psychosocial hazards).

Table 1-1. Summary of psychosocial hazards in the workplace.

Psychosocial Hazards	Description
Job content	Lack of variety, short work cycles, fragmented or meaningless work, under use of skills, continuous exposure to people through work
Workload, work pace	Work overload or underload, high levels of time pressure, continually subject to deadlines
Work schedule	Shift working, night shifts, inflexible work schedules, unpredictable work hours, long or unsociable hours
Control	Low participation in decision making, lack of control over workload, pacing
Environment, equipment	Inadequate equipment availability, suitability or maintenance, poor environmental conditions such as lack of space, lighting, excessive noise
Organisational culture, function	Poor communication, low levels of support for problem solving and personal development, lack of definition of, or agreement on, organisational objectives
Interpersonal relationships at work	Social or physical isolation, poor relationships with superiors, interpersonal conflict, lack of social support, bullying, harassment
Role in organisation	Role ambiguity, role conflict, responsibility for people
Career development	Career stagnation and uncertainty, under promotion or over promotion, poor pay, job insecurity, low social value to work
Home-work interface	Conflicting demands of work and home, low support at home, dual career problems

Adapted from Leka, S. & Jain, A. (2010). *Health impact of psychosocial hazards at work: an overview*. Geneva: World Health Organisation.

Those who are socio-economically or occupationally disadvantaged (e.g. low job control) can likewise experience greater mental ill-health effects from adverse circumstances at work such as job stress [79, 80, 100]. Furthermore, work circumstances such as unsafe environments [81, 82], employment status (e.g. casual and shift work, temporary job contracts) [83, 101], traumatic events (e.g. exposure to violence) [102], organisational change (e.g. downsizing,

restructuring, outsourcing) [103, 104] and perceived job dissatisfaction [105] have all been associated with mental ill-health. Nevertheless, mental illness is not a certain outcome in the face of this broad range of ‘job stressors’ (work-related factors magnifying the possibility of job stress and its longer term health consequences); many people work long-term in highly stressful jobs without mental ill-health effects.

1.3.4 Job stress frameworks and evidence of direct health effects

Three key frameworks are typically cited in literature relating to job stress; the job demand-control (JDC) model [106], the organisational justice model [107], and the effort-reward imbalance (ERI) model [108]. In general, these models suggest that there are elements of work that contribute to unhelpful stress arousal. When job-related stress arousal is sustained (i.e. it becomes chronic), individuals experience a condition of physical and/ or mental ‘strain’, which has an impact on health. The JDC model originally coined the term ‘job strain’ to describe the psychological consequences of inappropriate work design [106], and this concept has also been applied in the ERI model. A key criticism of all these models is their reliance on self-report data [109] and it has been suggested that individual perceptions mediate the relationship between job strain and poor health [110].

The JDC model focuses upon micro- or job task-level conditions of work. As the first major framework of job stress it is the most commonly cited, and has had several extensions, variously adding elements of ‘resources’ [111] or ‘social support’ [112] to describe the ‘control’ element. The model posits that job strain (or overload) is produced by ‘high strain’ work (e.g. ongoing conditions of low control and high demands) [106] and has been developed based on industrial forms of work rather than across a the range of occupations which are captured by the ERI and organisational justice models [113]. Several reviews have provided good support for links between elements in the JDC model with i) mental ill-health [114], and ii) CMD [61] but exposure mechanisms that lead to depression are less clear when this framework is used [31]. A large meta-analysis using the JDC model has recently queried the strength of the relationship between job strain and cardiovascular disease [115]. These results have fostered considerable debate due to concerns about the study participants’

age, limited inclusion of industrial workers, exposure misclassification, reliance upon a single baseline measure of JDC for assessing job strain and exclusion of other factors contributing to job strain such as poor social support, job insecurity and long work hours [116, 117, 113]. Furthermore, the study was based on traditional JDC measures and did not distinguish between cognitive, emotional and physical forms of job strain [113]. Interventions matched to these control elements have been identified by research using the JDC model as mediating recovery from job strain [118]. The authors of the meta-analysis have stood by their claims that job strain, as measured by the JDC model is only weakly correlated with cardiovascular diseases but have acknowledged a number of issues with the analysis [113].

The organisational justice framework is a more recent addition within job stress literature and rather than looking at job components, it emphasizes that organisational processes need to be procedurally and relationally ‘fair’. Procedural fairness centers on processes used to make decisions. Relational fairness refers to how employees are treated by their supervisors [107]. Lower perceived justice is argued to be the stressor associated with poorer employee health [119]. Overall, this model has received less attention in the literature, and it is often studied in reference to organisational change. Reviews have indicated support for a relationship between organisational justice and i) job stress [120], and ii) employee mental ill-health [121] that is independent of the other two job stress models. This framework was not pursued in this thesis because the ERI model had superior evidence supporting its relationship with enduring health outcomes.

The ERI model states that, at its most basic level, work is a type of social exchange of labour (effort) for some form of personal return (reward). This model is applied in this thesis and it focuses upon the macro-level but perceived ‘contractual conditions’ of work. At this level, work rewards include financial returns, self esteem and control over job status (i.e. career promotion prospects, job security). In contrast, effort refers to perceptions of time pressures, responsibilities and work demands. The author of this framework, Johannes Siegrist, posits that persistent conditions of high effort and low reward represent a pathway to job strain [108]. Research using the ERI model has provided the

best evidence across a broad range of occupations of linkages between job stress and enduring health outcomes such as cardiovascular disease [122, 123] and diabetes [124]. Key reviews have also shown that ERI is significantly associated with CMD [61] and stress disorders (e.g. adjustment disorder) [120]. Little evidence is available on how to intervene with ERI [125-128] but recent research has suggested that those at high-risk of imbalance have poorer recovery (less relaxation, less capacity to mentally detach from work, lower control) experiences compared with those at low-risk [129].

Although three models are conceptually distinct, data collected using their respective self-report measures shows statistical overlap in predicting health outcomes [130, 131]. This consideration, along with the strength of evidence supporting the ERI model, and practical issues relating to population surveillance led to the decision to use this model as the sole representation of the job stress construct in this thesis.

Much of the literature on mental health promotion in workplaces is derived from research applying these job stress models. Far less is known about workplace interventions that prevent mental ill-health at a whole-of-workforce scale.

1.3.5 Indirect effects of job stress

The effects of job stress go beyond the arousal pathways discussed above. Physical and mental health can also be at risk of harm through indirect pathways, because exposure to job stress can provoke short-term behavioural responses such as inappropriate nutrition [132], smoking [133], physical inactivity [134] and alcohol consumption [135]. In turn, these responses may lead to long term health outcomes such as obesity [136, 137], alcohol or substance abuse [138], nicotine addiction [133], anxiety disorders or cardiovascular disease [139, 99]. There is no straight line between cause and effect because personal vulnerabilities, sex, motivations, coping responses and social factors all play a role [138, 140, 141]. Evidence for the contribution of a causal relationship between work stress and adverse lifestyle outcomes is most consistent for workers who are overweight, men who drink excessive alcohol, and where several lifestyle risk factors co-occur for individuals [142].

Job stress can also lead to increased absenteeism [143] and presenteeism [144], and has been estimated to contribute to 40% of all job turnover [145]. It can have effects on business illness and injury rates, lead to increased workers' compensation premiums, increased health-care costs and decreased organisational citizenship (i.e. helping others, doing the right thing) [146]. In Australia, job strain-attributable depression has been estimated to affect 17% of employed women and 13% of employed men [147]. European studies have shown that 20-27% of cardiovascular diseases are attributable to chronic job stress [123]. Therefore indicators of job stress and occupational mental disease are important factors to consider when developing an overall picture of job- and health-related behaviours.

1.4 Effective interventions for workplace mental health

Interventions for physical and mental health have undergone significant development in the last 50 years. Terms, concepts and methods for illness prevention and health promotion that were once conceptually separate are now often used interchangeably in work settings. Although separate literatures have developed through public health and organisational research on workplace mental health interventions we have now reached a point where this information is again integrating. This section starts with an exploration of the historical context of these developments. It then examines the current evidence supporting preventive interventions for mental health in the workplace, and concludes with a critique of WHP as a particular form of universal intervention.

1.4.1 Historical context

In 1957, the Commission on Chronic Illness in the United States established a classification system for preventing disease within populations that identified two levels of intervention (i.e. primary and secondary) [148] with a tertiary element being added over the intervening decades [149]. This system was focused on preventing 'cases' of disease. Primary preventive intervention aimed to decrease new cases or incidence of disease. Secondary preventive intervention focused upon decreasing rates of disease cases [148]. Tertiary preventive intervention targeted existing cases of disease and aimed to reduce their associated disability [150]. The system was developed at a time when

causes of disease were implied by their effects, which were mainly defined as having acute, biological origins [149].

As was discussed in sections 1.2 and 1.3, we now know that the mechanisms between cause and effect for disease are not straightforward. In response to these challenges Robert Gordon proposed an alternative classification system for preventive intervention in 1983 that was more inclusive of chronic conditions and did not inadvertently imply that ‘primary’ was superior to ‘secondary’ prevention. Gordon instead focused upon weighing up the benefits, costs, effectiveness and risks of preventive approaches by concentrating on whether they were universal, selected or indicated. Universal interventions targeted the whole population and were considered to be those approaches that were largely acceptable, had low risk, low cost and proven efficacy. Selected prevention concentrated upon the population at-risk of disease, with risk being determined by associated social, biological or psychological factors. Indicated interventions were those derived for populations with minor but identifiable signs of disease, which were thus at high risk [149].

It is important to distinguish between these two frameworks because neither classification system was originally designed to address mental health. However, both have subsequently been applied as workplace interventions that include mental health components, albeit via different pathways. The Commission’s framework features prominently in several decades of stress management intervention literature due its adaptation within the organisational Theory of Preventive Stress Management (TPSM) [151, 152]. This theory classifies the point of intervention for risk prevention as primary (prevent occurrence), secondary (symptom reduction) and tertiary (treatment of illness) [153, 152]. Primary prevention may focus on management actions such as policy changes, work-role, job-design or environmental improvements or interpersonal supports. Secondary prevention can include individual mental strategies such as relaxation, meditation and cognitive behaviour therapy. Physical elements such as exercise or other lifestyle programs are also secondary intervention. Tertiary intervention focuses upon individual medical, psychological and behavioural supports such as clinical treatment, employee assistance programs, and behaviour modification or coaching [152]. In practice,

these strategies can target either individual employees or the organisational structure of their work, or be a combination of both approaches [154].

In contrast, the concepts iterated by Gordon have been integrated into modern forms of settings-based public health promotion [155]. As the public health discipline was developing these preventive intervention strategies, mental illness was also increasing in prominence as a chronic disease. In 1994 the Institute of Medicine in the United States used Gordon's framework to guide the prevention of mental disorders among the general population. However, the Institute made a clear definitional distinction between preventive intervention and health promotion. It described mental disorder prevention as "*enhancement of protective factors in an illness model*" (p.348) whereas mental health promotion was "*nurturing positive regard for oneself and the world around us*" (p. 348) [150].

Gordon's concepts made their way to organisational settings as the workplace 'wellness' programs of the 1970s and 1980s and evolved over time to take an ecological approach [156, 157]. Where these early wellness programs predominantly targeted individual physical illness and injury via strategies such as employee health risk assessment, health education and physical activities [156], modern WHP approaches have involved change to organisational structures and policies as well [157]. Thus the focus moved to incorporate individual and organisational intervention levels and it is possible to see overlap with the TPSM concepts, which instead are more specifically focused upon job stress, but also more broad-reaching in influencing organisational functions.

Modern WHP is a universal programme framework that has become popular among policy makers and employers due to its capacity to address chronic illness burdens as well as show returns on investment associated with health-related cost savings [158] and benefits to productivity through reductions in absenteeism and presenteeism [159]. The popularity of WHP has increased to the point where these strategies are now advocated in Europe and the United States as best-practice approaches to health intervention [9, 160] and are being used by large employers, including public sector organisations world wide [161, 162].

Separate to these developments in the field of WHP, scholars have now suggested that workplace mental health intervention needs to be considered from three perspectives, namely i) protection from job-related risks, ii) mental health promotion via enhancements in work design and worker capacities and iii) acknowledgement of, and response to mental health issues that exist among employees, irrespective of their origin [97]. From a public health standpoint, interventions can focus on strategies addressing mental disorders through either direct or indirect pathways [10]. This means that mental health has the potential to be addressed through programs directly targeting mental health such as those nominated above, or via the lifestyle risk factor pathway that has greater emphasis in WHP.

In summary, the wording and distinctions applied to preventive interventions for disease have evolved considerably over time. The inclusion of mental health in public health disease reduction strategies is a relatively recent phenomenon [150]. The next section examines the evidence associated with employee- and organisational-level interventions, drawn from the TPSM and WHP frameworks, and then examines universal interventions targeting workplace mental health giving special emphasis to comprehensive WHP.

1.4.2 Individual-level interventions

Efficacy of interventions targeting mental health

Much of the literature focusing on interventions addressing individual mental health stems from efficacy trials using stress management interventions and mainly focuses upon their ameliorative or treatment effects [163]. However, for workers who experience job strain as well as life stressors, the odds of major depression are increased nearly four-fold [164]. This finding suggests that strategies addressing worker mental ill-health need to consider a broad set of determinants.

The most effective individual interventions directly addressing mental health more broadly are cognitive behaviour therapies (CBT) [163]. These short-term psychological therapies focus upon changing unhelpful thoughts and feelings, and unhealthy actions in relation to an individual's circumstances. Preliminary evidence has also supported primary prevention via resilience training for at-risk

occupations (e.g. stress inoculation training) but not routine use of trauma debriefing or psycho-education [165]. Secondary prevention through stress management programmes (e.g. relaxation, meditation) has received mixed support [165-167]. Tertiary prevention approaches such as workplace counselling (e.g. Employee assistance programmes), return-to-work programmes and medication have received some research attention and results are inconclusive, unless CBT has been a factor in treatment [163].

Efficacy of interventions targeting lifestyle-risk behaviours

Participation in physical activity at work seems to indirectly assist with preventing mental ill-health among individual employees [6, 168]. Workplace health promotion programmes, which usually target a range of individual health behaviours, have also been found to enhance employee engagement, decrease sickness absence [6], enhance and reduce symptoms of CMD although overall effects have been modest [10]. A systematic review of data from randomised control trials and clinical trials has estimated WHP to improve reported well-being and work ability by around 40% [6].

1.4.3 Organisational-level interventions

Efficacy of interventions targeting mental health

Organisational-level interventions aim to adjust structural (e.g. strategies, policies, procedures), physical or psychosocial elements of the work environment to promote health and well-being and to address risks to mental health [169]. Interventions that directly target mental health can focus on specific policies and procedures (e.g. reducing stigma) [170], or can encourage enhanced control over work through strategies such as employee participation, job redesign or employment contracts [169]. The evidence for effectiveness of organisational-level interventions (e.g. job redesign to address task-related stress) directly targeting mental health remains weak despite considerable interest in the concept over time [171, 166] but some support has been found [172-174].

Efficacy of interventions targeting lifestyle risk factors

Indirect approaches targeting general health and physical well-being or lifestyle risk factors commonly fall under the global strategies of i) WHP, or ii) occupational or work-related health and safety (WHS) [175]. It is important to note that terms referring to mental illness are not usually specified in WHS legislation and are subsumed under a more general definition of ‘health’ (e.g. WHS Act 2012 [176]). Thus WHS regulations and processes are categorized as indirect forms of mental health promotion in this thesis. Work, health and safety initiatives appear to have been associated with decreases in reported physical illness and injury in Western countries. However, rates of occupational mental disease appear to be on the rise over the same period [51, 177, 178].

Research on ecological interventions linked to WHP programs, which has focused on changing environments and their policies to promote healthy behaviours (e.g. increasing worksite amenities, changing work canteen food, smoking policies), has shown these approaches to be most effective when they directly target the behaviour of interest [157]. Modest support has also been found for indirect intervention through WHP in reducing CMD [10] but the review for this thesis identified less than 5 published studies of these organisational-level strategies being used in comprehensive interventions [179-181].

1.4.4 Universal interventions targeting workplace mental health: Workplace health promotion

As was noted earlier, mental health interventions can target an entire population (be universal), be aimed at high-risk subgroups, or address those with symptoms within a population [149]. Reviews have highlighted that universal approaches can be effective in reducing symptoms of depression [18, 182]. For workers exposed to these approaches, evidence has again favoured cognitive behaviour therapies but overall support remains limited due to the comparative rarity of published information describing results from these types of interventions [182]. Cognitive therapy has also proven effective for people of working age experiencing anxiety [183], but is not necessarily superior to alternative forms of treatment such as applied relaxation [184] and mindfulness-based therapy [185].

The notion of ‘comprehensive’ WHP was developed by the United States Centre for Disease Control in the early 2000s and has been recommended as a best practice approach in North America since that time [7]. However, published studies reporting on mental health programs within comprehensive WHP are uncommon and the pervasiveness of these interventions remains unclear. Comprehensive WHP provides a set of guidelines on where to focus effort to enhance employee health, namely

- i) health education and activities,
- ii) health risk assessments (HRAs) [186],
- iii) supportive physical and social environments [162] (e.g. access to amenities, in-house equipment),
- iv) organisational provisions likely to enhance implementation effectiveness (e.g. leadership support, dedicated resources, compatible policies [7, 9, 187]) and
- v) harmonization with associated workplace programmes (e.g. employee assistance) [97].

The small number of published studies on comprehensive approaches have i) tended to focus on measuring lifestyle risk factors [159, 188], ii) concentrated on a certain segment of an organisation [181] or iii) used proxy indicators of mental health such as job stress [125]. Despite the advances this comprehensive approach represents for WHP, many prominent authors continue to omit mental health as a consideration in their commentaries and reviews on this topic [160, 189, 190]. We were unable to identify any large-scale universal studies that evaluated the effects of comprehensive WHP in relation to mental health outcomes.

It has been recently estimated that medical costs associated with chronic conditions could be reduced by 18% per working adult under optimum WHP conditions [191]. Longer term evidence also shows that benefits from WHP rely on well-designed, multi-component programmes that are sustained via an embedded health-promoting workplace culture [157, 189]. To be effective in addressing chronic illness, WHP needs to include health screening, provide programmes addressing multiple risk factors (e.g. physical inactivity, smoking, stress and poor nutrition) [192] and be supported through work environment

changes encouraging health promoting choices [186, 193]. Good quality recruitment strategies into WHP programmes also play an important role so that there is broad employee participation. Programmes need to be available and accessible to participants [194], and attract people at risk of poor health rather than just selective participation from the ‘worried well’ [195].

Overall, comprehensive WHP seems to hold promise but gaps remain in what is known about its relationship with mental health. In view of its growing popularity, and the need for policy direction on mental health, research at whole-of-workforce scale is needed in this area.

1.5 Taking a partnership approach for workplace intervention

This section describes the background factors leading to the conception of the project on which this thesis is based. As such it sets the scene for the development of aims and research questions by i) describing the evolution of the ‘Healthy@Work’ strategy, ii) discussing what is known about mental health in public sector settings and iii) critiquing ‘at-scale’ surveillance methods within work settings.

1.5.1 The research setting for this thesis

Geographical and project context

Tasmania is an island state of Australia with a population of approximately half a million people. Population-based indicators have shown that Tasmania has historically had relatively higher proportions of preventable diseases and health risk factors compared with mainland states of Australia [196]. Changes in demographic features of the working population have been of particular impact because Tasmanians are, on average, older and also experience greater socio-economic disadvantage (lower levels of education and income) than other Australians [197]. Current projections suggest that within 40 years the State will have the third highest proportion of people over 65 years in the developed world [198]. In 2015 these projections predict that 63% of people are of working age (15 to 65 years) and 18% of the population is over 65 years. By 2055 the potential working population will reduce to 55%, with 30% of Tasmanians being

over 65 years and possibly eligible for pension benefits. In 2009 the Tasmanian public sector represented ~10% of the working population or ~30,000 people.

These factors, along with increasing pressure on the acute health care system prompted the establishment of a special Physical Activity Council, chaired by the State's Premier (elected head of government) in the early 2000s. The Council initially advocated a focus on physical activity but then broadened its focus to workplace health and wellbeing programmes, which had perceived social (via health) and economic (via increased productivity) benefits at the time. In 2007, the Tasmanian Government launched 'Get Moving at Work: A resource kit for workplace health and wellbeing'. The Council, along with the state's WHS Regulator, (WorkCover Tasmania) developed this resource to assist local businesses with the practical elements of implementing health and wellbeing programmes. By 2008 a number of private and government organisations had implemented these programmes within their workforces.

Socio-political and public health context

The decade 2000-2009 was a period of change for psychiatric epidemiologists and occupational health professionals due to the increased focus on the global burden of mental health and its relationship with work [84, 199]. The repercussions of modern work on employees were becoming clearer with increasing fragmentation between the ideals of neo-liberal economic policy and the practice of work [200]. Furthermore emerging public health disparities were leading to calls for greater cohesion between work-related research and policy [201].

Advances in understanding of these issues were enhanced by improvements in the methodological tools, such as multilevel analysis and modelling. It became possible to separate the individual health outcomes due to an intervention from those occurring because people have similar work exposures (e.g. occupation, work unit) or characteristics (e.g. age, sex, health risks) [202]. Although population surveillance methods such as repeated cross-sectional analysis had been available prior to this period [203], improvements in multivariable regression techniques [204, 205], accompanied by more advanced statistical computing programmes made this type of research design more powerful and

more accessible to specific whole-of-population settings such as schools or workplaces.

The advent of the global financial crisis in 2008 placed intense focus on how business productivity was achieved and catalysed the need for urgent action in this area in Tasmania.

Background to Healthy@Work

Just as effects of the GFC were becoming evident in mid 2008, the Tasmanian Government made a 4-year commitment (2009-2012) to implement health and wellbeing programmes within its own public sector workforce, which was comprised of around 30,000 employees working around the state (urban, regional and remote) in a diverse range of organisations (e.g. health, education, police, forestry, electricity) and occupations. Over \$3 million was initially committed to this 'Healthy@Work' project, which commenced in November 2008. A December 2008 initial audit of workplace health and wellbeing activities within this public sector workforce showed that 6 of its 15 government organisations (also called departments) had a programme in place.

The goal of Healthy@Work was to support the development of health promotion programmes across its entire workforce that improved the health and wellbeing of all employees. It was intended to be a high quality programme framework that was devolved to departments through a mandated directive from the Premier. Key values associated with Healthy@Work were equity of access, leadership commitment, sustainability, targeting of key priorities, organisation-based strategies, framework flexibility and evaluation. Intended outcomes included

- i) improved health and wellbeing in relation to physical activity, nutrition, alcohol consumption, smoking and psychosocial factors (including mental health and stress),
- ii) increased employer and employee awareness of health and well-being issues,
- iii) improvement in workforce health and wellbeing policies and programmes within the Tasmanian Government. Programmes were to target the work environment as well as individuals,

- iv) employee-valued workplace health and wellbeing programmes and
- v) making healthy choices easy choices within the workforce.

Healthy@Work also implemented its own evaluation framework that included annual auditing of department programmes, an online survey, development and delivery of a work, health and well-being training course for department-based implementers, and qualitative focus groups of employees.

Background to Partnering Healthy@Work

In 2008, the National Health and Medical Research Council established a new type of government research funding called a 'Partnership for Better Health' that enabled policy makers and researchers to work together to develop, undertake and translate research projects. Partnering Healthy@Work was formally created in 2009 as a collaboration between university-based researchers and the Tasmanian Government to value-add to the Healthy@Work project. These investigators aimed to

- i) strengthen the research and evaluation methods for Healthy@Work,
- ii) develop new higher degree training opportunities in public health research and its translation into policy,
- iii) develop rigorous and policy-relevant research projects,
- iv) contribute to the improvement of health and productivity in the Tasmanian Government workforce and
- v) track the partnership process over time to provide comment on its evolution and outcomes.

This thesis was conceived through the Partnering Healthy@Work project.

1.5.2 Public sector workers and mental health

The public (or civil) service refers to a general name for the administrative system of government and its industry sector. Public service employees undertake a broad range of activities including i) developing and executing public policy decisions, ii) administering and enforcing regulation and iii) providing services to members of the public, businesses and other groups [206]. Since the introduction of Neo-liberalism, public services around the world have undergone considerable reform. In the past two decades, these reforms have

been captured under the umbrella term of ‘New Public Management’, and have introduced business and private sector management concepts into the traditionally large and bureaucratic apparatus of government [89]. As noted earlier, common change features have included downsizing, decentralization, service orientation and drives for productivity. There has been heavy criticism of these reforms, which have been associated with increases in job stress due to work role instability, loss of control, increased workloads and job insecurity [207]. Public sector employees have reported higher prevalence of mental ill-health than their private sector peers in the face of these changes [13, 208, 209]. Therefore it is important to know whether the Tasmanian Government workforce followed these trends.

In Australia, population surveys collecting national data on physical [196] and mental health [37] were conducted in 2007. However responses within the Tasmanian population were comparatively poor, particularly in relation to information on mental health. When Healthy@Work commenced no data were available on the mental health of the Tasmanian Government workforce. A voluntary, anonymous online survey implemented by Healthy@Work in 2009 provided an indication of prevalence of psychological distress in the working population but no population benchmarks were available for comparison. Therefore a question remained concerning the accuracy of these data, and whether they implied a mental health problem existed in the public sector workforce or not. This line of inquiry led to the development of the first research question, which was to determine the prevalence and correlates of psychological distress in the Tasmanian Government workforce.

Furthermore, in 2008 the Tasmanian Government was lagging behind other states in benchmark indicators of occupational injury and illness [210].

Preliminary information from regulatory reports had suggested that compensation claims for occupational mental diseases may have been a factor in rising government compensation premiums [211]. What was known about these mental disease claims suggested they had features consistent with indicators of long-term work disability [50]. However there was no research available on incidence or costs of mental disease claims for this public service, whether these were changing over time, or whether their features correlated with self-reported

psychological distress. The absence of clarity here led to the development of the second area of research inquiry, which aimed to establish the trends, costs and correlates of stress-related workers' compensation claims in this workforce.

1.5.3 Surveillance at-scale for whole-of-workforce interventions

Empirical support

Mental illness is a public health issue [71] and if we are to promote and protect mental health at-scale, population-level evidence is needed of what works at-scale [8, 11]. Workplaces have been used as settings for health intervention since the early 1970s with strategies variously targeting individuals and/or the way work is organised [156]. As noted earlier, efficacy studies have shown that workplace interventions can reduce symptoms of CMD [10]. While these types of studies have strong internal validity, their value to practitioners and policy makers can be limited where a complex set of factors are at play, as is evidenced by the aforementioned mental health research [58]. Empirical support for reductions in the incidence of mental disorders via workplace interventions using efficacy studies remains modest [10, 171, 163].

The interdependent nature of work and health is more appropriately represented by studies that are scaled up in size to measure effects at a whole-of-workforce level [212]. Population-level surveillance has been conducted in community settings and has shown that universal interventions can benefit public health policy development [213] however these methods are rarely seen in published research into CMD [212] and are virtually non-existent in work settings. The paucity of data in this area led to the development of research questions 3 and 4, which aimed to examine whether WHP was related to mental health or job stress.

Comparisons with efficacy studies

Studies of universal interventions also present challenges. Efficacy studies enable comparisons with control groups and can attempt to balance features of intervention and control groups. While whole-of-population approaches can include control communities, studies with observational dissemination designs offer no such comforts. Causality cannot be inferred; any observed differences are likely to be modest [12] and may be contributed by intervention and non-intervention factors [214]. Therefore strong methodology, attention to

contextual factors (e.g. societal trends, environmental changes) [215] and longitudinal measurement is essential for explanation of results [214].

Translation

Importantly, research results need to be translated in ways that assist further research and public health policy development. Given that at-scale research is likely to identify modest results, any results need to be considered in the context of other best-available evidence where gaps in data exist. Policy development on mental health is needed regardless of whether we have all the evidence at hand. Therefore, the discussion chapter of this thesis (Chapter 7) will combine the research results with information contained in Chapter 1 to identify implications and recommendations for research, employers, regulators and policy-makers.

1.5.4 Examining whole-of-workforce mental health

The Healthy@Work initiative offered a unique opportunity for at-scale observation of mental health promotion in a large and diverse workforce. In view of what was known about worker mental health in the context of the Tasmanian Government workforce several key research imperatives emerged:

- i) It was important to identify baseline prevalence of mental ill-health within the public sector workforce. The Tasmanian Government had data from its Healthy@Work survey, but without comparison population-level data it was hard to assess its validity or reliability. It was also necessary to investigate the correlates of poor mental health in this setting. This question is addressed in Chapter 3.
- ii) Given the indicators suggesting occupational mental disease may have increased in public sector workforces, and the downstream implications for work disability, it was important to identify trends and features of stress-related workers compensation claims for Tasmanian Government workers. These areas are addressed in Chapter 4.
- iii) From a policy perspective it was important to identify whether comprehensive workplace health promotion was related to mental health within this workforce, and whether this type of intervention could

contribute to a difference in mental health outcomes at-scale. Chapter 5 addresses these questions.

- iv) Building on the findings identified in Chapters 3 and 4, it was important to assess whether a key correlate of employee mental health, job stress, was related to comprehensive workplace health promotion. This area is addressed in Chapter 6.

Even though these data focus on a specific employer, this research addresses important gaps in what is known about workforce mental health promotion at whole-of-workforce scale. Therefore the information contained in this thesis is likely to be important for mental health researchers, occupational health professionals, employers and public policy-makers.

1.6 Thesis aims and research questions

1.6.1 General aim

This thesis aims to examine the promotion of mental health in the Tasmanian State Service workforce occurring in conjunction with the implementation of comprehensive workplace health promotion in a large and diverse public sector workforce.

1.6.2 Specific objectives

The specific aims of the studies reported in this thesis are:

- i) To determine the prevalence and correlates of psychological distress in a large and diverse public sector workforce [Chapter 3].
- ii) To establish the trends, costs and correlates of stress-related workers' compensation claims in a public sector workforce¹ [Chapter 4].
- iii) To assess if any components of Healthy@Work benefit mental health [Chapter 5].
- iv) To identify whether a relationship may exist between the Healthy@Work program and employee perceptions of job stress [Chapter 6].

¹ This study was conducted as a student internship within the Tasmanian Government

1.7 Summary

Chapter 1 has defined and categorized mental health and illness, and given an overview of its epidemiology. Individual and environmental determinants of worker mental health have been explored along with their health, productivity and societal effects. The types and effectiveness of workplace mental health interventions have been assessed with a particular focus on comprehensive workplace health promotion. Finally, this chapter set the scene for thesis aims and specific objectives by identifying research imperatives in at-scale research on workforce mental health promotion. The next chapter presents thesis methods. Chapters 3 to 6 contain the manuscripts that have addressed the research questions and chapter 7 discusses the overall implications of the thesis and presents its conclusions.

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Chapter 2. Methods

2.1 Preface

This thesis aims to examine the promotion of mental health in a large and diverse public sector workforce. Chapter 2 gives an overview of the research design and methods to the specific studies reported in the research papers that comprise Chapters 3 to 6. This chapter allows a more thorough discussion of methodological issues and data sources than those papers were able to provide. A variety of information sources were used in addition to data collected from the Partnering Healthy@Work surveys conducted in 2010 and 2013. This information included de-identified human resource administrative data, workers compensation data, the Tasmanian Population Health Survey (2009 & 2013), Tasmanian Government reports, and Healthy@Work documents, reports, surveys (2009 and 2012) and annual progress audits (Table 2.1 provides a summary of data sources). These data were used in this thesis to provide background context and information for the conceptualization, design and analysis of the studies presented in Chapters 3 to 6. For Chapter 3, these data were supplemented by a Confidentialised Unit Record File (CURF) from the National Survey of Mental Health and Wellbeing (2007) (1). In Chapter 4, workers compensation data were augmented by a conceptual review that included a documentation review and clarification interviews with key stakeholders. This chapter provides a description of key surveys and data sources, and the measures they contain.

Table 2-1. Summary of data sources cited in this thesis.

Data source	Chapter	Type	Population	Response Rate	n	Sampling method
PH@W 2010 ¹	3,5,6	Researcher-initiated survey	Tas Govt ⁵ employees	28%	3406	Random weighted postal
PH@W 2013	5,6	Researcher-initiated survey	Tas Govt ⁵ employees	28%	3228	Random weighted postal
H@W 2009 ²	3	Employer-initiated survey	Tas Govt employees	25%	7715	Non-random anonymous online
TPHS 2009 ³	3	Population normative survey	Tasmanian population	70%	3160	Random weighted telephone
TPHS 2013	5	“	“	75%	2111	“
NSMHWB 2007 ⁴	3	“	Australian population	60%	5499	Random weighted face-to-face
WorkCover Tasmania	4	Regulator records of compensation claims	Tas Govt employees	N/A	5851	All records 2007 – 2011
H@W audits	5	Employer annual audit	Tas Govt departments	100%	14	Paper and pencil form
Tas Govt, SafeWork, WorkCover	1,2,4	Public and internal documents	Australian workers	N/A	N/A	Literature search

¹ Partnering Healthy@Work² Healthy@Work³ Tasmanian Population Health Survey. Data were available for the general population but only those for employed persons were examined here.⁴ National Survey of Mental Health and Well-Being. As with the TPHS only data relating to working adults were examined for this thesis.⁵ Tasmanian Government

2.2 Study design

2.2.1 Design context

As was noted in Chapter 1, interactions between work and health are complex and bi-directional. Work environments are primarily concerned with core operations and comprehensive workplace health promotion (WHP) is a whole-of-working population intervention that has to be accommodated within these broader activities. As such, the effectiveness of an intervention can be influenced by a large number of work factors, including individual and work-group differences, occurring on a daily basis. Cohort or case-control studies are unable to replicate these complexities and are not appropriate in situations where the focus of intervention is on all of the workers within a defined population rather than a specific set of individuals (2).

Community-based research has shown that population interventions can be divided into treatment and control communities so that community variability is a component of analysis [e.g.(3)]. WHP was already present in some government departments when Healthy@Work was implemented and the initiative did not provide for an unexposed ‘community’ of workers. Thus this type of control-comparison group design was not able to be used for Partnering Healthy@Work.

2.2.2 Strengths of repeated cross-sectional designs

Repeated-cross sectional design is a form of population surveillance that has the advantage of collecting a new sample of responses at each time-point, which means that issues associated with attrition, prior exposure to assessments and ageing can be avoided. In larger populations, where research costs and logistical issues can escalate rapidly, these types of designs also offer a relatively affordable and straightforward means of data collection (4). Therefore randomized stratified sampling and weighting procedures are an important consideration to reduce sample and response biases. In comparison, cohort designs permit control for i) individual differences at baseline, and in exposure to interventions, ii) cross-contamination of results due to migration, and give

inference of causality. However they are far more expensive and complex to manage when conducted at-scale (4,5).

Population surveillance can produce reasonably robust results in the face of modest associations if multi-level analyses, which control for individual and group (e.g. government department) differences are applied. These types of considerations enhance generalizability (6).

2.2.3 Partnering Healthy@Work research design

The primary research design to evaluate Healthy@Work was a random, stratified cross-sectional sample survey of the public sector workforce that was repeated after 3 years. Given the scale of the project and opportunity to obtain a large respondent sample, this design was efficient and cost-effective (4). These self-report data were complimented by regulatory data on occupational diseases within the workforce prior to, and during Healthy@Work's implementation.

2.3 Partnering Healthy@Work Survey

The goal of the Partnering Healthy@Work survey was to i) accurately estimate the prevalence of chronic disease risk factors in the Tasmanian Government workforce in 2010 and 2013, and ii) to measure differences in these risk factors over time. The survey was not specifically intended to benchmark prevalence against other population surveys, however this was possible for the study described in Chapter 3 because the psychological distress (Kessler-10) measure was common to several data sources. Information was collected by this survey that also captured exposure of individual employees to Healthy@Work interventions. Full copies of both surveys are contained in Appendix A.

2.3.1 Sample design and response proportions

A random sample of employees was selected to receive a survey in 2010 with a different sample selected in 2013. Selection was stratified by government department, employment contract (permanent versus non-permanent), and working hours (full-time versus part-time). The sampling frame was compiled from an administrative data extract from the Tasmanian Government's Workforce Analysis and Collection Application (WACA) database (September

2009 for the 2010 survey; December 2012 for the 2013 survey). The WACA records data on every employee for a broad range of human resource variables. Eligible workers were current employees who had information for the sampling strata in the Workforce Analysis and Collection Application (WACA). Approximately 40% of eligible employees were randomly selected at each time-point to receive a postal survey. Each record had first been de-identified by the data custodian by replacing names with an alphanumeric code.

The first wave of data collection commenced in February 2010 and the second began in March 2013. Figure 2-1 provides a flowchart of sampling and responses to these surveys as at November 2014. In total, 28% of people who were sampled in 2010 and 27% of those sampled in 2013 responded to the surveys. For those who were sampled in both years, 580 employees also responded twice. This group of individuals with data collected at both time points was named the ‘cohort’.

2.3.2 Psychological distress

To estimate the prevalence of mental ill-health, the Partnering Healthy@Work survey used a measure of non-specific psychological distress, the Kessler-10 (K10) Screening Scale for Psychological Distress, which captures scores in a range of 10 (low) to 50 (high) (7,8). The K10 contains 10 questions asking about non-specific psychological distress experienced by respondents in the previous 4 weeks. For example, “In the past four weeks, about how often did you feel depressed?” Responses are provided on a 5-point scale ranging from ‘none of the time’ (scored as 1) to ‘all of the time’ (scored as 5).

The Kessler instrument was originally conceived as a short-form questionnaire so that it could be used as part of the United States National Health Interview Survey, which required a one-dimensional mental health measure comprised of 6 to 10 questions. Item response theory was used to reduce the original pool of 612 possible questions, derived from validated screening scales, into the K10 and a shorter 6-item version the K6. The K10 has high internal reliability (Cronbach’s $\alpha \sim 0.92$) that has been established in a range of international studies (7,9). It also has high sensitivity and specificity (Area under the Receiver Operating Characteristic curve = 0.88) (7).

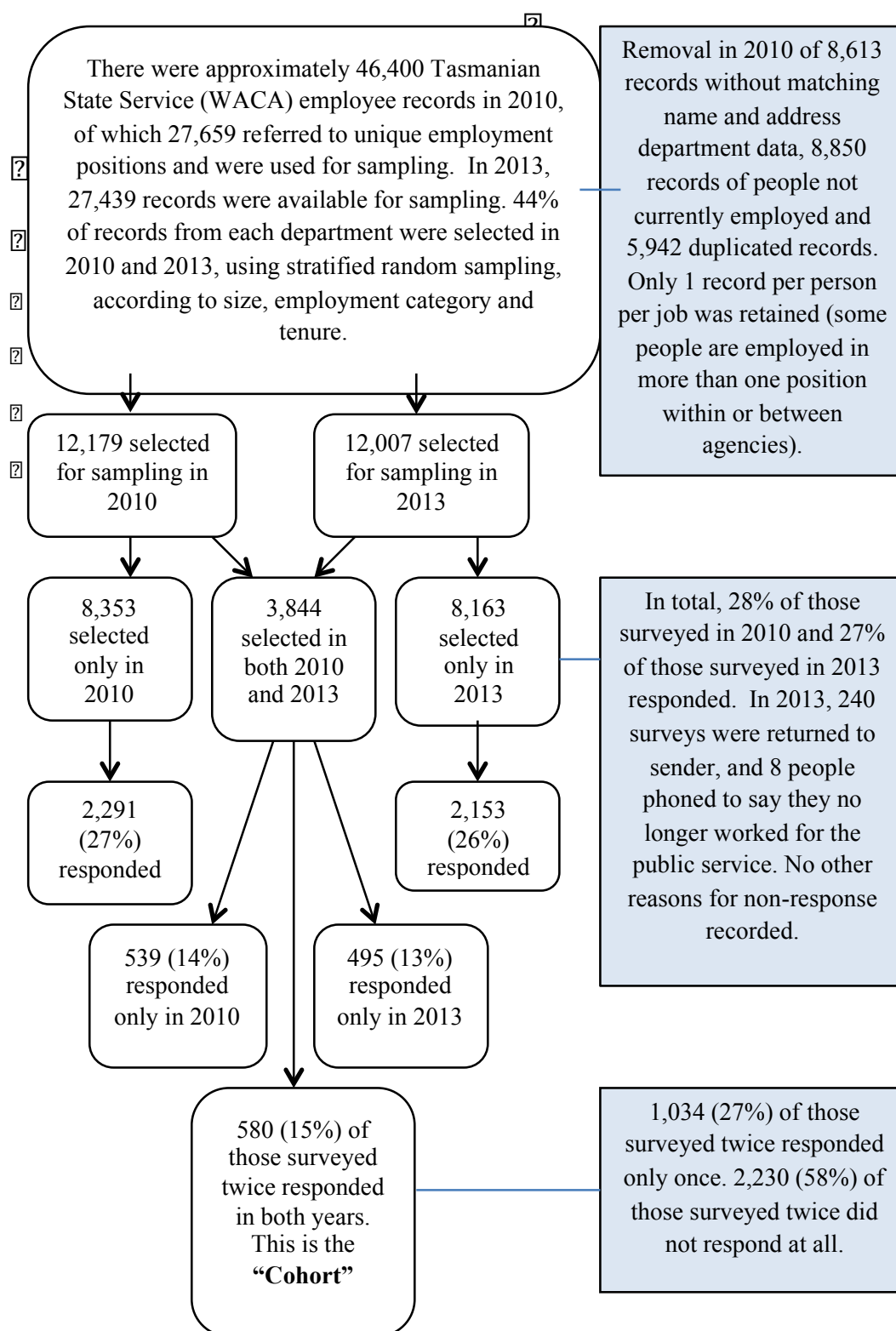


Figure 2-1. Flowchart showing sampling and responses to the Partnering Healthy@Work surveys as at November 2014.

Original validation of Test Information Curves using Item Response Theory highlighted that the K10 gave a better score precision (standard error range 0.14 - 0.24) for severe mood and anxiety disorders than the K6. The K10 also clearly outperformed the General Health Questionnaire in discriminating these disorders when compared against gold standard interview tools (7). This superior discriminant validity has been supported by other studies using the General Health Questionnaire (8) and the Short Form-12 Health Survey, which has a focus on disability rather than distress (10,11). The univariable structure of the K10 has also been supported using confirmatory factor analysis (comparative fit index = 0.97; scores >0.95 represent good fit) in samples of the general population (9).

The K10 has been applied in large population surveys of mental health around the world (11,12). Its counterpart, the K6, is included in the first section of the World Health Organisation Health and Productivity Questionnaire (HPQ), which was designed to identify worker health problems, their effects, costs and potential solutions (13). The HPQ has been successfully used in a range of occupational settings around the world (14,15), including in Australian public sector workforces (16). Although the K6 has typically been applied in these working populations, the K10 was selected here because it has greater precision in the high to very-high range of diagnosis (7).

For the study reported in Chapter 3 which is concerned with prevalence of psychological distress, the total K10 distress score is categorized as low [score: 10-21] versus high [score: 22-50] (17). A high (>22) or very high score (>29) gives a strong indication of a clinically diagnosable mental health condition (7). In Chapter 5, the K10 is assessed using a continuous score.

2.3.3 Effort-reward imbalance

The Effort-Reward Imbalance (ERI) questionnaire is a commonly applied validated self-report survey of job stress with 6 items measuring Effort and 11 items dedicated to Reward. The questionnaire asks questions about the respondent's current work situation and focuses upon macro-level exchange of

effort for reward. It is divided into two key scales covering these factors. An example of an effort question is, “I have constant time pressure due to a heavy workload”. The original version of the ERI questionnaire (available in 2008) was used in the Partnering Healthy@Work survey and thus has 5 response categories ranging from ‘disagree’ (scored as 1), to ‘agree, and I am very distressed’ (scored as 5). Rewards can be categorized as a whole factor or according to sub-factors describing self-esteem, job security, income or career prospects. An example reward question is “my job promotion prospects are poor”.

The questionnaire’s psychometric properties are well-established. Good scale reliability (Cronbach’s $\alpha > 0.7$) has been observed in many studies with satisfactory test-retest reliability (18-20). Confirmatory factor analyses have also demonstrated good model fit for the dimensions of effort and the three subscales of reward (18,21). Scores obtained from the effort scale have modest-to-strong correlations ($r = 0.30-0.60$) with those of the demand scale from the Job Demand Control (JDC) model, but effort-reward imbalance provides independent explanation of job-related strain to that of the JDC and Organisational Justice models (22-25). Importantly, effort-reward imbalance has been extensively measured in public sector workforces across countries (26-28) as well as within work occupations that are highly prevalent in the Tasmanian Government workforce (e.g. teachers, health care workers) (29-31).

A publication by Tsutsumi and colleagues [32] recommended that the 5-category response format described above be replaced by a 4-item format using “strongly disagree” to “strongly agree”. The two formats have been found to have similar psychometric properties, with the latter obtaining higher response rates [33]. However, the available format at the time of the 2010 survey was the 5-item format and this was applied again in 2013 for consistency.

Effort-reward imbalance ratio scores of 1 or more typically denote an imbalance of high effort and low reward conditions. An effort and reward ratio is calculated for every person by first adding all scores for each of the effort (e) and reward (r) scales, then applying the formula $e/(r \times c)$ where c represents the correction factor of 6/11 [21]. The ERI score is frequently calculated as tertiles in published studies and Chapter 3 uses this format to enable comparison. In

Chapter 6, ERI is applied as a continuous score as this approach allowed for greater variance in scores and was thus a more accurate representation of the full dataset. This approach maximised the likelihood of capturing modest but robust changes in job stress over time.

2.3.4 Measuring exposure to workplace health promotion activities

Organisational change and system job stress was not part of Healthy@Work so direct-organisational interventions (e.g. psychosocial changes) were not recorded.

In each Partnering Healthy@Work survey, participants were asked to indicate which Healthy@Work activities and supports were available in their workplace by giving a 'yes' or 'no' answer to a list of WHP initiatives. Where a respondent gave a 'yes' answer, they were also asked to write the number of times they had participated in activities. These were comprised of

- health assessments (e.g. health checks, fitness assessments),
- mental health and well-being programs (e.g. stress management, employee assistance programs, stretching and relaxation, education and training),
- health education (e.g. seminars, workshops),
- physical activity programs (e.g. sessions, sports teams),
- injury prevention/rehabilitation,
- health policies (e.g. flexible work) and
- amenities (e.g. physical space for health-activities, healthy food options, onsite gymnasium, access to stairs, health information bulletins).

For the studies reported in Chapters 5 and 6, we counted the number of positive responses each person provided for the availability question to give an indication of total availability (i.e. reach) of Healthy@Work [34] and used the mean times participated to represent the dose of WHP they received [35]. For Chapter 5, total availability was classified into one of 3 groups;

- i) direct-mental health - availability of activities directly targeting individual mental health and well-being (e.g. mental health literacy education, stress management);

- ii) indirect-individual - individually targeted activities targeting known risk factors associated with poor mental health (i.e. health education, health assessments, physical activity, injury support);
- iii) indirect-organisational - workplace initiatives indirectly targeting mental health (i.e. amenities, policies).

Because the total number of items in each availability category varied, these scores were converted to percentages to standardise exposure comparisons across categories for Chapter 5. Participation was classified into direct- and indirect-individual categories only, which were then added together to form a mean total participation score.

2.3.5 Other survey content

All health outcome measures within this thesis have demonstrated reliability and validity. Our research team developed the Partnering Healthy@Work random sample survey. The Partnering Healthy@Work survey measures relevant to this thesis included: marital status (married or partner (Defacto), not married); education level (up to year 10, up to year 12, post school); general physical health as measured by the SF-12 physical component summary scale [36]; smoking habits (daily smoker, all others) [37], fruit and vegetable intake (inadequate, adequate) from the Dietary Guideline Index [38]; height and weight to measure body mass index (BMI); alcohol intake from the Audit-C questionnaire [39] (high risk, low risk) was measured using the National Health and Medical Research Council [40] guidelines; total physical activity (minutes) was the total of total leisure time minutes added to total work minutes and was derived from the International Physical Activity Questionnaire – Long version (IPAQ) [41].

Contractual work characteristics including days worked (Monday to Friday, days vary weekly, other), schedule worked (regular days, other), and hours worked were measured using employment descriptors from the Household Income and Labour Dynamics in Australia survey [42]. Preferred Work Hours was a psychosocial variable derived from the British Household Panel survey [43]. Questions about job stress (effort-reward imbalance) [33] and Healthy@Work initiatives developed by Partnering Healthy@Work (availability and

participation) were also included in the survey and are described in forthcoming sections of Chapter 2.

The content of the Partnering Healthy@Work survey remained largely the same for 2010 and 2013. After consultation among the Partners in 2013, the second survey included several extra questions, and added to the list of response options available for questions on availability of amenities (question 27) and health and lifestyle activities (question 28). Furthermore, the format for these exposure questions (described later in this chapter) used for Chapters 5 and 6 changed between these years. In 2010, question 28 gave a list of health and well-being activities, asking respondents whether each activity was available in their workplace in the previous 12 months, and if so the number of times they had participated in that time. In 2013, its equivalent section (question 33) clustered some of the items on the original list together to form health and lifestyle categories (e.g. education, health assessments, physical activity, smoking, mental health and wellbeing). This was done as listing all possible activities implemented during Healthy@Work was prohibitively long. This latter survey also changed the response time period to the ‘past 3 years’ rather than 12 months to cover the period of the Healthy@Work intervention. Issues associated with these changes are noted in Chapters 5, 6 and 7.

2.3.6 Survey recruitment

2010 Partnering Healthy@Work survey

A pilot version of this survey was distributed to all the employees of one Tasmanian Government organisation in November 2009. The conduct of, and comments from this process led to minor adjustments to the survey’s content. When the survey was finalized, our research team provided this information along with a letter describing the survey and the randomly generated sample list to the Tasmanian Government main contractor in January 2010. This contractor managed printing, organised survey packs and distributed the surveys. A communication message explaining the survey’s process and content was also developed by our team for agencies to distribute all staff in late January 2010 via mechanisms such as Head of Department emails, in-house newsletters, and the intranet.

The survey packs were sent through internal Tasmanian Government mail to the selected participants in February 2010 and included reply-paid envelopes addressed to our team at the Menzies Institute for Medical Research. Departments were asked to provide reminders about the survey in pay-slips, newsletters and email. Although a 4-week response deadline was initially specified in the survey forms, and most surveys were received by May 2010, late returns were added to the Partnering Healthy@Work database as they were received.

2013 Partnering Healthy@Work survey

Administration for the 2013 survey was outsourced to a business specializing in survey process management. The recruitment process was essentially identical to that of 2010 with the exception that the distributor was responsible for survey packs, collation of returned forms and data entry.

2.3.7 Data linkage with the Workforce Analysis and Collection Application

For the studies in Chapters 3, 5 and 6 the Partnering Healthy@Work survey response data were linked to their respective WACA variables for age, sex, employment condition (permanent, fixed-term or casual), employment category (full-time, part-time), annual salary, job classification, tenure (within the Tasmanian Government, by department) and public sector organisation (department).

The WACA database did not categorise data into a common set of salary bands for its industrial awards. Details of occupation types were also incomplete for the standard Australia and New Zealand Standard Classification of Occupation (ANZSCO) variable. Therefore, the categories for bands and occupations were derived through a separate process, which is described in Appendix B. This process led to the development of the 'Band' variable that is indicative of organisational seniority (Bands 1-3 [low], Bands 4-6 [mid], Bands 7-8 [high/manager], Bands 9-10 [very high/ senior executive]), and 'Occupation' variables (blue collar, white collar, service, professional, manager) which are used in Chapters 3, 5 and 6.

Weighting procedure

After linkage, propensity weighting was used to weight Partnering Healthy@Work survey data so that results could be inferred as though every employee sampled had responded [44]. This type of weighting reduces problems associated with non-response bias. A weight was allocated to each survey respondent to account for age, sex, government department, employment contract, working hours, and tenure using the WACA database as the reference population. However, weighting will only be a remedy for a low response rates when missing data is missing at random.

2.4 Healthy@Work Survey

The Healthy@Work workforce survey (discussed in Chapter 3) was employer initiated and made available in an intranet-based format from March to May 2009 to all Tasmanian Government employees with an individual work-email address. Employees were allowed to complete the survey during working hours and participation was promoted through internal communication networks. It was designed by the Tasmanian Government from an earlier Premier's Physical Activity Council questionnaire and asked about age, sex, psychological distress (Kessler-10), body mass index, current smoking, physical activity, alcohol use, and fruit and vegetable intake. These lifestyle factors and behaviours have been shown to increase the chance of developing chronic health conditions like cardiovascular disease and diabetes. The questions for age, sex, psychological distress, body mass index and alcohol consumption were identical to those in the Partnering Healthy@Work survey. Distinct from the Partnering Healthy@Work survey, it did not i) measure broader socio-demographic information, work contextual factors or psychosocial variables, ii) use random selection or population stratification procedures, and iii) it was anonymous so responses could not be matched to de-identified administrative data. The response rate for the Healthy@Work survey in 2009 was 25% (N = 7715). Data on age, sex and psychological distress were extracted for the study in Chapter 3.

2.5 Population health surveys

For the data presented in Chapter 3, we collated comparable psychological distress prevalence data for workers from two Australian cross-sectional datasets: the 2007 National Survey of Mental Health and Well-Being (NSMHWB) [45] and the Tasmanian Population Health Survey 2009 (TPHS) [46, 47]. Data from these comparative surveys were extracted for age, sex, employment status (i.e. workers) and psychological distress (Kessler-10).

2.5.1 National Survey of Mental Health and Wellbeing

The NSMHWB survey was a stratified random sample face-to-face household survey targeting Australian adults aged 16 to 85 years (N = 5499 employed persons) in 2007. In addition to psychological distress, it collected information on the prevalence of selected mental disorders, distinguishing ‘lifetime’ occurrence from that of ‘the previous 12 months’. This survey also collected data on demographic and socio-economic factors, physical conditions, level of impairment and health service use. The response rate was 60% for this survey, and data were weighted according to Australian population benchmarks for age and sex to permit inferences about the adult population. Direct extraction of CURF records for the Tasmanian population was not possible from the NSMHWB due to low survey response numbers in this region.

2.5.2 Tasmanian Population Health Survey

The TPHS was initiated by the Tasmanian Government as an extension of the Victorian Population Health Survey in 2009 (repeated in 2013) and used Computer Assisted Telephone Interviewing (CATI). It applied random stratified sampling to target Tasmanian residents with landline telephones who were over 18 years. Survey questions captured data on a range of lifestyle and health behaviours including psychological distress, diet, weight, alcohol use, smoking, physical activity, asthma, diabetes and some chronic diseases. These data were then weighted for age, sex, number of household telephone lines and number of persons in the household. The TPHS response rate was 70% in 2009 and 75% in 2013. The de-identified survey data for 2009 were directly available for analysis for the study in Chapter 3 (N = 3160 employed persons) but not in 2013 due to a

change in ethics requirements. An analysed extract of weighted data by age-group and sex for ‘waged adults’ was instead supplied by the Tasmanian Government for the 2009 (N=2548) and 2013 (N=2548) survey comparisons of Tasmanian worker psychological distress that are referenced in the discussion section of Chapter 6 (Appendix F-1).

2.6 Other Partnering Healthy@Work documentation and information

Throughout this thesis references are made to decisions, actions and circumstances affecting the Tasmanian Government workforce, including the implementation of the Healthy@Work initiative. This information has been sourced from Tasmanian Government publications (e.g. State Service Commissioner annual reports 2008 to 2014), documents (e.g. Ministerial Directive 23, strategic plans, Healthy@Work updates, progress and closure reports), audits (e.g. Healthy@Work annual audits of progress from each department), meeting notes, websites, presentations, and key stakeholder interviews (e.g. Healthy@Work staff). The Partnering Healthy@Work team has also conducted process and outcome evaluations for the project (e.g. partnership processes, project processes). Although this information has not been specifically analysed in Chapters 3 to 6 it has contributed to the conceptualisation and interpretation of these studies. To give further context on the progress of Healthy@Work over time, the sub-analysis of audit data that is described in Chapter 5 has been presented in Figure E-2.

2.7 Workers’ compensation dataset

2.7.1 Overview

The *Tasmanian Rehabilitation and Workers Compensation Act 1988* (the Act) covers all Tasmanian employers and mandates specific administrative actions concerning injuries and illnesses reported in the workplace. One of these actions is the forwarding of all content from compensation claim forms submitted by employees to the regulatory authority responsible for administering the Act,

WorkCover Tasmania. WorkCover Tasmania maintains a centralised database of all compensation claims in this State. Similar forms of legislation are implemented in each Australian state albeit with different compensation claim forms and data capture requirements. Data from each state are regularly compiled and forwarded to the national body responsible for collating statistics on workplace illnesses and injuries, SafeWork Australia. These data are then centrally retained within the National Data Set for Compensation-based Statistics (NDS) and form the basis of Australian statistics on work-related injuries and diseases. SafeWork Australia sets the strategy for work health and safety in this country, develops and implements related policies and legislation, conducts research and reports on relevant statistics.

As the study described in Chapter 4 evolved, significant questions arose about the content of the dataset and systems relating to stress claims. These questions led to a conceptual review of workers compensation structures and systems in Tasmania, which focused on stress claims and is reported in the commentary in Appendix D. The process for this review is described later in this section.

2.7.2 Stress claims

Stress-related claims (stress claims) were derived from the ‘mental diseases’ category for accepted claims in the WorkCover dataset, which includes claims for anxiety or stress disorders, depression, anxiety and depression combined, reactions to stressors, unspecified mental diseases, and post-traumatic stress disorder (PTSD). All other types of claims were defined as ‘not-stress-related’ (NSR).

2.7.3 Data extraction and variables

For the study described in Chapter 4, a de-identified dataset on all workers compensation claims submitted by Tasmanian Government employees during the period from 1 July 2007 to 30 June 2011 was sourced from WorkCover Tasmania in May 2013. This start date of 1 July 2007 was established to coincide with the introduction of major changes in compensation legislation and its regulations in Tasmania [48].

The workers compensation dataset included variables for type of claim (mental diseases, other illnesses and injuries), claim report year, age, sex, Australia and New Zealand Standard Classification of Occupations (ANZSCO) code, leave days, type of cost, date of payment and mechanism of injury.

At the time of data extraction, all ongoing claims were excluded from the index year, however the dataset did not contain identifying features needed to establish whether new claims were aggravated (changed from one type of illness or injury to another) or recurrent. A total of 5851 new claims were extracted. A report to the Tasmanian Government describing compensation data is presented in Appendix C.

2.7.4 Claim characteristics and costs

Based upon advice from WorkCover Tasmania, accepted claims were defined as those claims with attributed costs. These claims notionally identified cases where the Tasmanian Government had accepted responsibility for the workplace injury or illness, and were arguably ‘proven’ to have been caused by a factor in the work environment.

A ‘claim duration’ variable was created by calculating a notional ‘closed date’ where no further claims for costs had been made within a 6-month period. Costs are defined as ‘everything paid out in a financial year, regardless of claim report year’. Cost variables included payments to doctors (including psychiatrists), hospitals, vocational rehabilitation services, allied health providers, wages, miscellaneous (e.g. travel, accommodation), investigation and legal expenses (borne by the employer). The costs presented in Chapter 4 are net costs in Australian dollars, separated from costs able to be reimbursed by other forms of insurance. Costs were reported in financial years to allow for conversion to constant prices for the periods 2007-08 to 2010-11 [49]. ‘Total cost’ was the sum of all individual costs associated with a claim. Details of service provision associated with costs were not supplied within the dataset. Appendix E-1 contains a table showing the calculations used for conversion to constant prices.

2.7.5 Mechanism of Injury for stress claims

Mechanism of Injury refers to the Type of Occurrence Classification Scheme (ToOCS) 3rd Edition [50] coding of the claimant's written description of how the injury or disease occurred. It notionally describes the cause of the injury or illness. The Mechanism of Injury coding variables were categorized as i) work pressure (deadlines, responsibilities, restructuring, interpersonal conflict, performance based management), ii) workplace harassment and/ or workplace bullying (repetitive assault, harassment, abuse, threats), and iii) other (exposure to a traumatic event, exposure to workplace or occupational violence, suicide or attempted suicide, other harassment, other mental stress factors).

Occupations coding

Australia and New Zealand Standard Classification of Occupations sub-categories were manually reviewed to create new themed categories that enabled comparisons with existing Tasmanian Government award categories that had been established for the research reported in Chapter 3. This led to their subsequent categorization as blue collar (e.g. manual work), white collar (e.g. administrative work), service (e.g. nurses, teachers, police, community service and emergency service workers), professional (e.g. professionally titled) and manager.

2.7.6 Conceptual review

The information reported in the commentary to Chapter 4 (Appendix D) was collated from:

- i) a student placement within the Tasmanian Government that gave the context for the workers' compensation study and enabled development of knowledge on this topic via discussions with work, health and safety professionals,
- ii) a documentation review of Australian WHS websites, legislation, regulations, SafeWork publications, compensation claim forms, and the ToOCs categories for mental diseases,
- iii) critical assessment of the content of WorkCover database and
- iv) literature review of work factors contributing to job stress.

This information was collected on an ongoing basis from March 2012 to November 2014 as analysis for Chapter 4 proceeded and results emerged.

2.8 Data analysis

Methods of data analysis for each individual study are reported in detail in their respective chapters. In summary

- i) the study in Chapter 3 compares prevalence of high psychological distress (K10) by age and sex for two workforce surveys and two population surveys. The weighted Partnering Healthy@Work survey data is then used to develop log binomial regression models to discriminate characteristics of men and women at risk of high distress in the Tasmanian Government workforce,
- ii) in Chapter 4 the WorkCover dataset is used to identify trends in the numbers of men and women submitting workers compensation claims (stress vs. not-stress) and their costs between 2007 and 2011. These claims are evaluated using regression modelling techniques. Log binomial modelling is also used to classify features uniquely associated with stress claims,
- iii) Chapter 5 uses the Partnering Healthy@Work surveys to perform repeated cross-sectional analysis and identifies a) whether mean psychological distress is different over time and b) associations between psychological distress and components of WHP over time. Mixed modelling, stratified by sex, with random intercepts for department and participants is used to allow for correlated responses. Confirmatory evidence of these models was obtained by corroborating the analysis using the cohort of repeat responders. Supplementary data for this chapter are presented in Appendix E.
- iv) repeated cross-sectional analysis with mixed modelling is again applied using the Partnering Healthy@Work surveys in Chapter 6. In this chapter the outcomes of interest are job stress (ERI), and its dimensions of effort and reward. Differences in job stress are assessed over time by

sex, as are its relationships with the availability of and participation in WHP.

2.9 Ethics

Written informed consent was obtained from all participants in the Partnering Healthy@Work surveys. Ethics approval for the studies reported in Chapters 3, 5 and 6 was provided by the Health and Medical Research Ethics Committee (Tasmania) Network (ID: H0010501). Under Tasmanian workers compensation legislation, de-identified workers compensation data can be released for research purposes so informed consent from claimants was not required for the study reported in Chapter 4. Ethics approval for this study was supplied by the Social Sciences Health Research Ethics Committee (Tasmania) Network (ID: H0012363).

2.10 Summary

This chapter provides an overview of the research design and detailed information on the sources and methods for collecting data on employee mental health within the Tasmanian Government, and the nature and structure of samples used to infer results. It explained the quality of source data, and described the weighting strategies used to ensure that data and findings derived from the Partnering Healthy@Work survey were generalisable to other similar public sector populations. Chapter 2 also gave background on the workers compensation dataset and conceptual review that are described in Chapter 4.

In the next chapter, data derived from four data sources described here, two workforce and two population surveys are used to explore the prevalence and correlates of high psychological distress in the Tasmanian Government.

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Chapter 3. Prevalence and correlates of psychological distress in a large and diverse public sector workforce: baseline results from Partnering Healthy@Work

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3.1 Preface

When the Healthy@Work project commenced, the prevalence of mental ill-health was unclear within the Tasmanian working population and its subgroup, the Tasmanian Government workforce. In 2009 a population health survey was undertaken for Tasmania and the state government also conducted an online survey of workforce health. The following year the Partnering Healthy@Work postal survey was distributed within the government workforce. This chapter describes how these data sources were collated and compared with Australian mental health benchmarks. It also gives particular attention to the partnership data by identifying and classifying the socio-demographic, health and work correlates that were predictive of high psychological distress in 2010.

3.2 Introduction

The common mental disorders of depression and anxiety are among the greatest public health challenges of this era (1). The earlier issues such as workplace depression are accurately identified and treated, the sooner improvements in work outcomes are likely to occur (2). As a result, understanding the nature of workplace-based risks associated with poor mental health and addressing these risk factors has been an area of considerable research and practice interest. Researchers have argued that employers should

become involved in workforce screening of mental health because the data obtained can assist the development of relevant workplace interventions (3).

Despite the need for workplace action on issues such as depression, transfer of mental health screening into the hands of an employer has specific barriers and challenges (4). First, employers are typically interested in feedback systems that enable sound management decisions. However, employer surveys are usually anonymous and have volunteer samples (5) that can affect the validity and generalizability of findings.

Second, mental health screening using Health Risk Appraisals (HRAs) has evolved from individually focused, clinical settings (5) rather than work environments. Although there is some evidence supporting the use of HRAs in physical health promotion at work (6) there seems to be a gap in published information on the results obtained by employers who use mental health or associated measures. For example, despite the efforts that Great Britain's Health and Safety Executive (HSE) has made to develop a viable measure of psychosocial safety, a recent study reported that employers were not using the HSE Indicator Tool as recommended (i.e. used abridged versions, applied only once, substituted with other measures) (7).

Third, employers are realistically concerned about the legal implications of identifying mental health conditions in the workplace (8). Therefore, to encourage engagement in mental health screening researchers have a role in educating employers about how to interpret findings in view of: a) the limitations of the screening methods and measures used: and b) the expected ranges given the demographic profile of their workforce.

A key population of interest for mental health screening is the public sector (also referred to as the state or government sector), whose employees appear to be vulnerable to poor mental health (3,9). Given the large number of employees impacted internationally, accurate monitoring of the mental health of public sector employees seems to be an important consideration for public health.

The mental health status of public sector workforces has been researched for several decades (e.g. Whitehall (10), WORC (3)) and has coincided with the

implementation of New Public Management (NPM) organisational concepts within civil services around the world. These reforms have led to a wide range of changes to the traditional roles of government and its associated management structures. Reforms have typically included the introduction of private sector concepts such as outsourcing, rationalization, decentralization and performance orientation (11).

There has been considerable debate as to whether organisational change has a negative impact on these employees (12), but evidence from public service populations has reported increased job strain (13), increased presenteeism (14) and sick leave (15), and decreased organisational commitment (13). Public sector employees have been found to report higher levels of psychological distress than their private sector counterparts (16,17). However, we do not know if these purported higher levels are a consequence of the different survey methods used, or are due to actual differences in distress in these working populations. In the absence of clarity on these issues, interpretation of whether a public sector result is 'high' or not can be furthered by making comparison with working population norms for psychological distress. We acknowledge that population norms can underestimate the prevalence of poor mental health due to non-response bias (18) and as a result comparisons are imperfect. Despite their limitations, these norms can act as a third 'best estimate' of prevalence where organisational data are contradictory.

One validated way of assessing risk for depressive and anxiety disorders is the Kessler 10 (K10) brief screening scale (19). This 10-item scale measures 'psychological distress' and has acceptable performance as a screener for DSM-IV depressive and anxiety disorders (20). Although the K10 can be used to assess the prevalence of psychological distress in workers, it gives no clues about modifiable risk factors influencing poor mental health. When the K10 is applied in a HRA context, it is important to assess whether high distress is associated with the typical demographic, socio-economic, health, and work correlates found in other literature (10). If the K10 correlates with expected characteristics this result adds evidence of validity to the application of the K10 for detecting high distress in public sector employees.

In this study, results obtained from random weighted and anonymous volunteer HRA surveys using the K10 were compared within a large and diverse public sector organisation. We wanted to assess whether the prevalence of high psychological distress was greater than that of working population norms and verify that the K10 results were associated with expected correlates in a screening setting.

Using a researcher survey as the reference, the aims of this study were to: a) compare the self-reported prevalence of psychological distress measured with a brief screener with that of an employer survey; b) determine whether prevalence differed to normative population data; and c) investigate and classify the socio-demographic, health and work correlates of self-reported high psychological distress.

3.3 Method

3.3.1 Setting

This study was based in Tasmania, which is an island State of Australia with a population of approximately 500,000 people. The setting for this research was in the form of a partnership, ‘Partnering Healthy@Work’ (PH@W), between the Tasmanian Government and the University of Tasmania. The Tasmanian State Service (TSS) is one of the region’s largest employers with approximately 30,000 employees and incorporates a wide range of government departments (e.g. health, education, environment), occupations and locations (city-based, rural, remote). Since 2009, the Tasmanian Government has invested more than \$2 million in workplace health promotion, the “Healthy@Work” (H@W) initiative, targeting their whole workforce. Ethics approval for the study was obtained from the Human Research Ethics Committee (Tasmania) Network (ID: H0010501).

3.3.2 Study design

Partnering Healthy@Work is a longitudinal evaluation of H@W that includes collection and assembly of data from a range of data sources: a repeated, randomly-selected cross-sectional health workforce survey initiated by

researchers (PH@W 2010 and 2013); an anonymous online employer-initiated workforce health survey (H@W 2009 and 2011); and human resource administrative data. This study used data from the first employer (H@W 2009) and researcher (PH@W 2010) workforce surveys, comparing it to normative prevalence data for the Australian and Tasmanian working populations.

3.3.3 Public sector workforce data sources

The researcher survey was distributed in February 2010 to TSS employees. We selected a 40% random population sample from the total pool of employees, stratified according to employment condition, employment category and agency. The response rate was 28% (N = 3406).

Survey responses were merged with an extract of administrative data from the TSS human resources database to permit analyses according to the key demographic variables of age, sex, employment condition (permanent, fixed-term or casual), employment category (full-time, part-time), annual salary, job classification ((Bands 1-3 [low], Bands 4-6 [mid], Bands 7-8 [high/ manager], Bands 9-10 [very high/ senior executive]), industrial award (blue collar, white collar, service, professional, manager), tenure (within the TSS, by government department) and public sector agency.

Standard survey weighting for the researcher survey was not possible due to very low response rates and zero cells in several strata. Therefore, to adjust for possible response bias, we applied the inverse probability of response weighting method described by Hofler and colleagues (21) based on a model including age, sex, government department, employment category, employment condition, and tenure using the human resources database as the reference population.

The employer survey was made available in an intranet-based format in 2009 to all TSS employees. It was designed by the TSS using a range of pre-existing measures and had a response rate of 25% (N = 7715). This survey asked about age, sex, psychological distress (K10) and a range of lifestyle factors and behaviours that increase the chance of developing chronic health conditions like cardiovascular disease and diabetes. Distinct from the researcher survey, it did not: a) measure broader socio-demographic information, work contextual

factors or psychosocial variables; b) use random selection or population stratification procedures; and c) it was anonymous so responses could not be matched to human resources data.

3.3.4 Comparative normative data sources

We collated population normative data for workers with the same K10 measure of psychological distress from two Australian cross-sectional datasets: a national mental disorder prevalence survey, the National Survey of Mental Health and Well-Being (NSMHWB) (22), and the Tasmanian Population Health Survey 2009 (TPHS) (23) (Table 1). The NSMHWB had a 60% response rate (N =7715 workers). Weighted survey respondent characteristics indicated 50% were female, 57% were married/Defacto and 37% were in the 35 to 54 years age-range. The TPHS had a 70% response rate (N=3160 workers) and weighted characteristics showed 57% were female, 71% were married/ Defacto and 56% were in the 35-54 years age range. Data were extracted by age, sex, employment status (i.e. workers) and psychological distress.

3.3.5 Measures

All of the surveys sought information on employed individuals' age and sex as well as psychological distress using the Kessler-10 (K10) screening scale which scores in a range of 10 to 50 (19,20). The K10 total psychological distress score was categorized as low (10-21) versus high (22-50) (24). A high (≥ 22) or very high score (> 29) gives a strong indication of a clinically diagnosable mental health condition (19).

Table 3-1. Data sources to compare employee psychological distress (Kessler 10).

Survey	Type	Population	Participation Rate	n	Method
PH@W 2010 ¹	Researcher-initiated	TSS ⁵ employees	28%	3406	Random weighted paper and pencil
H@W 2009 ²	Employer-initiated	TSS employees	25%	7715	Non-random anonymous online
TPHS 2009 ³	Population normative	Tasmanian working adults	70%	3160	Random weighted telephone
NSMHWB 2007 ⁴	Population normative	Australian working adults	60%	5499	Random weighted face-to-face

¹ Partnering Healthy@Work.

² Healthy@Work.

³ Tasmanian Population Health Survey.

⁴ National Survey of Mental Health and Well-Being.

⁵ Tasmanian State Service.

The researcher survey measures, which were used to establish the correlates of psychological distress, included marital status (married or Defacto, not married); education level (up to year 10, up to year 12, post school); general physical health as measured by the SF-12 physical component summary scale (25); smoking habits (daily smoker, all others) (26); fruit and vegetable intake (inadequate, adequate) (27); height and weight to measure body mass index (BMI); alcohol intake (28) (high risk, low risk) measured using national guidelines (29); and total physical activity (minutes per week) derived from the Long International Physical Activity Questionnaire (IPAQ) (30).

Preferred work hours and contractual work characteristics included days worked (Monday to Friday, days vary weekly, other), schedule worked (regular days, other), and hours worked. Other psychosocial factors were measured using the Effort Reward Imbalance (ERI) questionnaire, which is a commonly applied validated self-report survey with 6 items measuring Effort and 11 items dedicated to Reward. A ratio is calculated for every person by first adding all

scores for each of the effort (e) and reward (r) scales, then applying the formula $e/(r \times c)$ where c equals the proportion 6/11 (31). ERI ratio scores ≥ 1 are argued to indicate an imbalance of high effort and low reward conditions.

3.3.6 Statistical analysis

We first derived the prevalence of high psychological distress as proportions of participants with K10 scores of 22 or greater by age and sex in the researcher and employer surveys and the two population normative datasets, using the researcher survey as the reference to calculate variance estimates. The differences between proportions were assessed by calculating standard errors using the standard normal approximation for large samples, and assumed independent sampling. Analysis was stratified by sex. This approach was taken on theoretical grounds (32,33) because of known differences between men and women in correlates of psychological distress.

Second, we used the researcher survey data for multivariable model building (34) with dichotomized psychological distress as the outcome variable. We conducted a univariable analysis, and selected those variables with a p -value less than 0.25 for further analysis. Then we performed logistic regression analyses, entering the selected variables one at a time and conducting a Wald test upon each new variable's entry to determine if that variable significantly ($p < 0.05$) increased model discrimination. This process selected the set of variables that provided the best discrimination between low and high psychological distress. ROC values of greater than 0.7 and less than 0.8 model 'acceptable discrimination' (34).

Separated by sex, individual covariates were entered one at a time in order of demographic (age, marital status), socio-economic (annual salary, education, occupation), contractual work characteristics (employment condition, employment category, tenure, hours worked, days worked, job classification, schedule worked), health behaviours (general physical health, inadequate fruit and vegetable intake, daily smoker, high risk alcohol, BMI, total physical activity) and psychosocial work environment (preferred hours, ERI). These classification processes did not permit data weighting procedures, so when these analyses were complete, the final sets of variables were used to build log

binomial regression models by sex of the predictors of high psychological distress for estimation of weighted prevalence ratios (PR) (35). All analyses were conducted using STATA 12.1 (StataCorp LP, Texas, USA).

3.4 Results

3.4.1 Prevalence of high psychological distress

The prevalence estimates of high psychological distress in the two Tasmanian State Service (TSS) workforce surveys are shown in Table 3-2, stratified by age and sex. The results show that the employer survey estimates of prevalence of psychological distress were statistically different ($p < 0.001$) to those of the researcher survey for both men (5.9% higher) and women (6.4% higher).

Using the same reference, high psychological distress totals were lower for male Tasmanian workers who were sampled in the TPHS ($p = 0.013$) and Australian workers in the NSMHWB survey ($p = 0.002$). Prevalence estimates of high psychological distress for women in the population surveys were not statistically different ($p > 0.05$) to those obtained by the researcher survey but they had higher average percentages than those calculated for men.

Within the 16 to 24 year age-group in men the differences in the TSS surveys are also pronounced (18.7% for the researcher survey and 23.7% [$p = 0.002$] for the employer survey) when compared with both the TPHS (7.1%, $p = 0.132$) and the NSMHWB (6.2%, $p < 0.001$). Prevalence percentages for the employer survey were elevated across all male age-groups. For the TSS surveys, the prevalence of high psychological distress in the 16 to 24 year and 25 to 34 year women's age-groups also appeared higher than in the population surveys, with these elevations being consistent for all age-groups in the employer survey.

Table 3-2. Prevalence (%) of high psychological distress¹ by age and sex reported in surveys of Tasmanian and Australian employees.

<i>Age-group (years)</i>	Men % (N²)				Women % (N)			
	PH@W 2010³	H@W 2009⁴	TPHS 2009⁵	NSMHWB 2007⁶	PH@W 2010	H@W 2009	TPHS 2009	NSMHWB 2007
16 - 24	18.7 (16)	23.7 (131)	7.1 (84)	6.2 (512)	16.7 (64)	23.7 (329)	11.1 (80)	11.7 (564)
25 - 34	7.4 (103)	17.3 (394)	6.7 (177)	9.1 (467)	16.4 (337)	22.7 (1001)	9.8 (256)	14.8 (544)
35 - 44	11.8 (222)	17.0 (695)	7.4 (323)	6.5 (687)	13.2 (551)	18.1 (1329)	11.4 (471)	10.7 (674)
45 - 54	11.5 (373)	15.6 (801)	7.8 (392)	8.8 (483)	10.3 (956)	16.1 (1871)	10.1 (586)	10.8 (555)
55 - 64	7.1 (219)	12.0 (417)	7.5 (278)	4.2 (396)	6.7 (477)	14.8 (856)	10.1 (353)	7.7 (379)
65+	0.0 (15)	20.0 (25)	2.5 (80)	3.4 (153)	3.8 (27)	11.4 (35)	9.4 (52)	7.6 (85)
Total	10.2 (948)	16.1 (2463)	7.1 (1334)	6.8 (2698)	11.6 (2412)	18.0 (5421)	10.4 (1798)	11.2 (2801)
p ⁷	ref	<0.001	0.013	0.002	ref	<0.001	0.217	0.651

¹ Prevalence was measured using the Kessler 10 (K10) and dichotomized as 'high' versus 'low' distress with K10 scores ≥ 22 being rated as 'high'.

² N, total number of respondents by category.

³ Partnering Healthy@Work 2010, researcher-initiated survey of Tasmanian State Service employees (weighted).

⁴ Healthy@Work survey 2009, employer-initiated survey of Tasmanian State Service employees (unweighted).

⁵ Tasmanian Population Health Survey 2009, population normative data of Tasmanian workers (weighted).

⁶ National Survey of Mental Health and Well-Being 2007, population normative data of Australian workers (weighted).

⁷ p-value for the differences between total prevalence of psychological distress in the survey, relative to PH@W 2010.

3.4.2 Sample characteristics

For the researcher survey, the average age of respondents was 45 years and 67% were female (Table 3-3). Most respondents were married (77%), had received education up to Year 10 (54%), were permanently employed (90%), full-time (61%) employees working regular schedules (81%), Monday to Friday (57%). On average, respondents had public sector tenure of 12 years, worked 38 hours a week and received an annual salary of A\$66,236. The weighting process showed that the respondents were more likely than non-respondents to be older, female, of longer tenure, full-time employees, and to have worked within specific government departments.

3.4.3 Univariable correlates of high psychological distress

Men and women showed many similar univariable correlates for high psychological distress that were statistically significant ($p < 0.05$) (Table 3-4). Using the parameters described in the Methods section, marital status, state service tenure, health behaviours, preferred hours and ERI were selected for subsequent model building across both sexes. Although age was only significantly associated with distress for women, it was included in the men's model due to its clinical importance. For men, a unique association was

Table 3-3. Respondent characteristics for the Partnering Healthy@Work 2010 survey.

<i>Variable</i>	Men	Women	Total
	% (n)	% (n)	% (n) ³
Age, mean (SE ⁴)	45.74 (0.35)	44.52 (0.22)	44.92 (0.19)
16-24	0.02 (19)	0.03 (74)	0.03 (93)
25-34	0.13 (124)	0.17 (416)	0.16 (540)
35-44	0.26 (249)	0.24 (587)	0.25 (836)
45-54	0.37 (355)	0.38 (930)	0.37 (1285)
55-64	0.20 (192)	0.17 (416)	0.18 (608)
65+	0.02 (20)	.001 (24)	0.01 (44)
Marital Status			
Married/Defacto	0.82 (766)	0.74 (1769)	0.77 (2559)
Not married	0.18 (168)	0.26 (621)	0.23 (765)
Occupation			
Service	0.26 (240)	0.42 (911)	0.37 (1151)
Blue Collar	0.13 (120)	0.18 (386)	0.16 (506)
Admin	0.25 (231)	0.24 (521)	0.24 (752)
Professional	0.06 (57)	0.02 (52)	0.04 (109)
Manager	0.30 (275)	0.14 (296)	0.19 (571)
Annual Salary - mean (SE)	A\$73137 (\$1199)	A\$62788 (\$403)	A\$ 66236 (\$489)
Education			
Post School	0.53 (502)	0.55 (1328)	0.54 (1830)
Up to Year 10	0.09 (85)	0.14 (338)	0.13 (423)
Up to Year 12/ certificate	0.38 (360)	0.31 (749)	0.33 (1109)
Job Classification			
Bands 1-3	0.21 (200)	0.35 (848)	0.30 (1048)
Bands 4-6	0.54 (514)	0.55 (1335)	0.55 (1849)
Bands 7-8	0.17 (162)	0.08 (194)	0.11 (356)
Bands 9-10	0.08 (76)	0.02 (49)	0.04 (125)
Employment Category			
Permanent	0.87 (834)	0.92 (2251)	0.90 (3065)
Fixed-Term/ Casual	0.13 (125)	0.08 (196)	0.10 (341)
Employment Condition			
Full Time	0.83 (796)	0.49 (1199)	0.61 (2078)
Part Time	0.17 (163)	0.51 (1248)	0.39 (1328)
Tenure, years– mean (SE)			
State Service	13.02(.36)	11.77(.20)	12.19 (.18)
Agency	8.47 (.26)	7.99 (.13)	8.15 (.12)
Days worked			
Mon to Fri	0.69 (657)	0.52 (1265)	0.57 (1922)
Days vary weekly	0.18 (171)	0.16 (389)	0.16 (557)
Other	0.13 (124)	0.32 (779)	0.27 (903)
Schedule worked			
Regular day	0.79 (758)	0.82 (2007)	0.81 (2765)
Other types	0.21 (201)	0.18 (440)	0.19 (641)
Hours worked hours - mean (SE)	40.2 (0.43)	36.5 (0.32)	37.8 (0.26)
Preferred hours			
Same hours	0.61 (579)	0.58 (1408)	0.59 (1987)
Less hours	0.34 (323)	0.36 (874)	0.35 (1197)
More hours	0.05 (48)	0.06 (146)	0.06 (194)
General Physical Health ¹ - mean (SE)	52.51 (0.22)	51.21 (0.17)	51.65 (0.14)
BMI - mean (SE)	26.92 (0.15)	26.37 (0.12)	26.56 (0.09)

Table 3-3 cont. Respondent characteristics for the Partnering Healthy@Work 2010 survey.

<i>Variable</i>	Men	Women	Total
	% (n) ³	% (n)	% (n)
Alcohol Intake			
High Risk	0.23 (203)	0.17 (368)	0.19 (571)
Low Risk	0.77 (681)	0.83 (1798)	0.81 (2479)
Fruit & Veg Intake			
Inadequate	0.46 (441)	0.35 (856)	0.39 (1327)
Adequate	0.54 (518)	0.65 (1591)	0.61 (2109)
Smoker			
Daily Smoker	0.34 (169)	0.31 (374)	0.32 (543)
All Others	0.66 (329)	0.69 (831)	0.68 (1160)
Physical Activity ²			
Lower Tertile	0.36 (343)	0.33 (801)	0.34 (1144)
Middle Tertile	0.33 (315)	0.33 (802)	0.33 (1117)
Upper Tertile	0.31 (296)	0.34 (826)	0.33 (1122)
ERI ⁵ - mean (SE)	0.44 (0.007)	0.45 (0.005)	0.45 (0.004)
Lower Tertile	0.33 (307)	0.32 (753)	0.32 (1060)
Middle Tertile	0.36 (335)	0.33 (777)	0.34 (1112)
Upper Tertile	0.31 (288)	0.35 (824)	0.34 (1112)
Kessler 10			
High Psychological Distress	0.90 (853)	0.88 (2123)	0.89 (2990)
Low Psychological Distress	0.10 (95)	0.12 (289)	0.11 (370)
Overall	(0.33) 959	(0.67) 2447	(1.00) 3406

¹ General health was derived from SF12 aggregate physical score. US adult score mean is 49.6; SD 9.91 (36).

² Physical activity tertile ranges 0-146, 147-252, 253-362. This variable represents 'all physical activity' as a total of all work and leisure physical activity.

³ n, number of respondents by category.

⁴ SE, Standard Error.

⁵ ERI, Effort-Reward Imbalance: Tertile ranges: Males = 0.2-0.33 (lower); 0.34 - 0.46 (middle); 0.47 - 2.93 (upper). Females = 0.2 - 0.33 (lower); 0.34 - 0.46 (middle); 0.47 - 2.69 (upper).

apparent for employment category and employment condition. Occupation, annual salary and department tenure were uniquely associated with high psychological distress among women. Furthermore, women had a significant association for both 'less hours' and 'more hours' in the preferred hours category whereas men only met the inclusion criterion for the 'less hours' category. For men, state service tenure was added at the conclusion of preliminary main effects modelling [34].

Table 3-4. Univariable logistic regression analysis.

<i>Variable</i>	Men PR¹ (95% CI)	<i>p</i>	Women PR (95% CI)	<i>p</i>
Age (years) continuous	0.99 (0.98 - 1.01)	0.355	0.97 (0.97 - 0.98)	<0.001
16-24	1.00	-	1.00	-
25-34	0.40 (0.12 - 1.35)	0.139	0.98 (.053 - 1.83)	0.959
35-44	0.63 (0.21 - 1.87)	0.406	0.79 (0.43 - 1.45)	0.446
45-54	0.62 (0.21 - 1.78)	0.372	0.62 (0.34 - 1.13)	0.116
55-64	0.38 (0.12 - 1.18)	0.095	0.40 (0.21 - 0.78)	0.007
65+	Insufficient cases	0.000	0.23 (0.03 - 1.70)	0.150
Marital Status				
Not married	2.00 (1.32 - 3.05)	0.001	1.41 (1.10 - 1.79)	.006
Married/Defacto	1.00	-	1.00	-
Occupation				
Blue Collar	1.15 (0.62 - 2.13)	0.668	1.24 (0.88 - 1.74)	0.227
Admin	0.94 (0.54 - 1.62)	0.815	1.41 (1.05 - 1.91)	0.023
Service	1.00	-	1.00	-
Professional	1.55 (0.76 - 3.13)	0.228	1.29 (0.60 - 2.80)	0.517
Manager	0.85 (0.49 - 1.46)	0.553	1.35 (0.92 - 1.96)	0.123
Annual Salary	1.01 (0.97 - 1.06)	0.638	0.94 (0.88 - 1.00)	0.044
Education				
Up to Year 10	0.63 (0.26 - 1.53)	0.308	0.92 (0.65 - 1.31)	0.653
Up to Year 12/certificate	1.22 (0.82 - 1.83)	0.322	1.02 (0.80 - 1.33)	0.826
Post School	1.00	-	1.00	-
Job Classification				
Bands 1-3	0.96 (0.58 - 1.59)	0.872	0.92 (0.72 - 1.17)	0.484
Bands 4-6	0.97 (0.51 - 1.85)	0.930	0.86 (0.55 - 1.36)	0.518
Bands 7-8	1.32 (0.64 - 2.72)	0.444	0.56 (0.21 - 1.48)	0.244
Bands 9-10	1.00	-	1.00	-
Employment Category				
Fixed Term/ Casual	1.77 (1.10 - 2.86)	0.018	1.18 (0.79 - 1.77)	0.427
Permanent	1.00	-	1.00	-
Employment Condition				
Part Time	1.41 (0.88 - 2.26)	.0156	0.90 (0.72 - 1.13)	0.351
Full Time	1.00	-	1.00	-
Tenure				
State Service	0.99 (0.97 - 1.00)	0.119	0.98 (0.97 - 0.99)	<0.001
Agency	0.99 (0.97 - 1.01)	0.285	0.98 (0.96 - 1.00)	0.051
Days worked				
Days Vary Weekly	0.83 (0.47 - 1.48)	0.534	1.12 (0.82 - 1.53)	0.463
Other	1.48 (0.89 - 2.44)	0.129	0.85 (0.65 - 1.11)	0.235
Mon to Fri	1.00	-	1.00	-
Schedule worked				
Regular day	1.06 (0.65 - 1.72)	0.812	0.89 (0.66 - 1.19)	0.421
Other types	1.00	-	1.00	-
Hours worked	1.00 (0.98 - 1.02)	0.881	1.00 (1.00 - 1.01)	0.422
Preferred hours				
Less hours	1.49 (1.00 - 2.22)	.052	1.39 (1.10 - 1.76)	0.006
Same hours	1.00	-	1.00	-
More hours	1.26 (0.48 - 3.32)	0.635	1.56 (1.01 - 2.42)	0.047
General Health ²	1.01 (0.97 - 1.06)	0.661	0.99 (0.98 - 1.01)	0.489
BMI (per unit)	1.05 (1.01 - 1.08)	0.010	1.02 (1.00 - 1.05)	0.038
Alcohol Intake				
High Risk	1.60 (1.05 - 2.44)	0.030	1.61 (1.21 - 2.13)	0.001
Low Risk	1.00	-	1.00	-

Table 3-4 cont. Univariable logistic regression analysis.

<i>Variable</i>	Men PR¹ (95% CI)	<i>p</i>	Women PR (95% CI)	<i>p</i>
Fruit & Veg Intake				
Inadequate	1.41 (0.96 - 2.08)	0.079	1.46 (1.16 – 1.83)	0.001
Adequate	1.00	-	1.00	-
Smoker				
Daily Smoker	1.89 (0.99 - 3.61)	0.053	1.36 (0.94 – 1.97)	0.105
All Others	1.00	-	1.00	-
Physical Activity ³				
Lower	1.30 (0.78 - 2.18)	0.318	0.89 (0.66 – 1.20)	0.442
Middle	1.92 (1.18 - 3.11)	0.008	1.23 (0.94 – 1.61)	0.134
Upper	1.00		1.00	-
ERI tertiles ⁴				
Lower	1.00	-	1.00	-
Middle	1.02 (0.53 – 1.96)	0.950	1.53 (1.00 – 2.35)	0.051
Upper	3.54 (2.10 - 5.97)	<0.001	4.59 (3.20 – 6.60)	<0.001

High psychological distress prevalence ratios for men and women participating in the Partnering Healthy@Work 2010 survey.

¹ PR, Prevalence Ratio using inverse probability weighting method.

² General Health is derived from SF12 aggregate physical score.

³ Physical activity tertile ranges (minutes per week) 0-146, 147-252, 253-362 – a combination of total work and leisure minutes.

⁴ ERI, Effort-Reward Imbalance tertile ranges: Males = 0.21-0.36 (lower); 0.36 - 0.49 (middle); 0.49 – 2.32 (upper). Females = 0.21 - 0.36 (lower); 0.36 - 0.50 (middle); 0.50 – 2.05 (upper).

3.4.4 Discriminating high psychological distress

The variables contained in the fully adjusted model for men (Table 3-5) were classified as acceptably discriminating (ROC = 0.77) were age, marital status, employment category, state service tenure, BMI, alcohol use, daily smoking, and perceptions of high-effort and low-reward. This set of variables provided the best discrimination between high and low/moderate psychological distress (ROC = .76), with independent associations being found for younger age, fixed-term/casual employment and the upper tertile of ERI. Weighted population estimates of high distress prevalence by ERI tertiles for men were 5.8% (lower), 5.3% (middle) and 20.5% (upper) respectively. A 3-fold increase in prevalence of psychological distress was evident between the highest and lowest ERI categories in the resultant model.

Among women, the set of variables providing the best discrimination between high and low/moderate psychological distress (ROC = 0.75) were age, marital status, state service tenure BMI, alcohol use, daily smoking, fruit and vegetable intake and ERI were included in the model. Independent associations with high

distress were found in the fully adjusted model for women who were younger, unmarried, and in the upper tertile of ERI (Table 3-5). Weighted population estimates of high distress prevalence by ERI tertile for women were 4.7% (lower), 7.2% (middle) and 22.0% (upper) respectively.

Weighted population estimates of high distress prevalence by ERI tertile for women were similar to those for men being 4.7% (lower), 7.2% (middle) and 22.0% (upper) respectively. A 5-fold increase in psychological distress prevalence was identified in the highest versus lowest ERI categories.

Table 3-5. Sequential log binomial regression models classifying correlates of high psychological distress by sex.

<i>Variables</i>	Men			Women		
	PR¹	95% CI²	<i>p</i>	PR	95% CI	<i>p</i>
Demographic variables						
Age	0.97	0.94 – 1.00	0.016	0.97	0.95 – 0.99	0.007
Marital Status	1.31	0.70 – 2.48	0.388	1.44	1.01 – 2.05	0.048
Job characteristics						
Employment category	2.61	1.25 – 5.47	0.011	-	-	-
State Service tenure	0.98	0.95 – 1.01	0.147	0.99	0.96 – 1.01	0.240
Health-risk behaviours						
BMI	1.03	0.97 – 1.09	0.396	1.02	0.99 – 1.05	0.143
Risky alcohol	1.24	0.68 – 2.26	0.479	1.17	0.79 – 1.71	0.438
Daily smoker	1.86	0.89 – 3.92	0.101	1.35	0.88 – 2.09	0.168
Inadequate fruit and vegetable intake	-	-	-	1.27	0.88 – 1.80	0.200
Psychosocial factors						
ERI ²						
Middle	0.79	0.30 – 2.05	0.624	1.52	0.75 – 3.11	0.246
Upper	3.37	1.52 – 7.47	0.003	5.28	2.91 – 9.75	<0.001
ROC ³		.7659			.7559	

¹ PR, Prevalence Ratio; CI, Confidence Interval.

² ERI, Effort-Reward Imbalance tertiles.

³ ROC, Area under the Receiver Operating Characteristics curve

- Models for men and women were calculated separately.

- Reference categories: married or defacto, permanent employment, not risky alcohol, not daily smoker, ERI lower tertile. Age, state service tenure and BMI are continuous variables.

- Omitted categories, designated with a ‘-’ identify that the variable did not make a contribution ($p > 0.05$) to the ROC.

3.5 Discussion

In this study we compared the self-reported prevalence of high psychological distress between two surveys of a public sector workforce and then with population normative worker surveys using the same K10 brief screening measure. We examined whether there were differences in the results obtained from employer and researcher approaches to data collection and we also investigated the socio-demographic, health and work correlates of high psychological distress

For both sexes, we found that the prevalence of high psychological distress was greater in the employer survey when it was referenced to the researcher survey. This higher prevalence was observed across all age-groups for the employer survey. When the researcher survey was compared with population norms for workers, prevalence of high distress was greater for men but not women. It is interesting that the women's researcher and population surveys showed strong consistency in prevalence estimates despite their differing modes of data collection (telephone, paper-pencil and interview) and arguably dissimilar workforces.

Age-group differences in prevalence were also identified when comparing the public sector and population surveys, particularly with the youngest male and female age-groups. Psychological distress has been found to be more prevalent among younger people and tends to decrease as age increases (24). Jorm and colleagues (37) found that problems such as job threats, personal problems and ending relationships were most prominent among younger age groups.

Moreover, early working life coincides with a potentially stressful major developmental stage as adolescents move into adulthood and have to cope with associated adult responsibilities (38). Recent papers have advocated the need to generally target younger workers with mental health promotion strategies (39,40) so although the age-group differences evident in this study are not conclusive, our results are in a direction that is consistent with other research.

Despite previous validation of the online K10 as a screener for depression (41), in this study administration of the K10 by an employer to a volunteer sample of employees appears to have overestimated prevalence. Screening is an

important component of prevention and treatment efforts (42) but guidance on interpretation is needed to prevent inaccurate conclusions about the prevalence of distress or where preventive efforts should be targeted. Furthermore, as has been found elsewhere (3), age and sex data make a relatively limited contribution by themselves to our understanding of the drivers of worker psychological distress within organisations. It was a necessary step in this research setting to assess whether high distress, as measured by the K10, was associated with expected correlates. Modelling was necessary to investigate this issue.

The logistic modelling results showed that the best set of variables to predict high psychological distress in both men and women were age, marital status, state service tenure, BMI, alcohol use, daily smoking and ERI, although not all included variables were independently associated with distress. For men, employment category (permanent vs. fixed-term/ casual) was also important, while for women fruit and vegetable intake contributed to model discrimination but was not itself independently associated with distress.

In the men's fully adjusted model, high psychological distress was independently associated with lower age, fixed term or casual employment and the upper tertile of ERI. High distress prevalence was twice as likely for men in fixed term or casual employment and three times more likely if they were experiencing high effort reward imbalance. It has historically been argued that rationalization of the public sector has contributed to higher levels of psychological distress (9). Although this public service had not commenced rationalization at the time of the surveys, lag effects of historical organisational changes could be considered. Men have also been found to be at higher risk of psychological distress in the face of job insecurity (43) which can be assessed through employment category and ERI variables. Nevertheless, it is also possible that workers with poorer mental health are more likely to hold precarious temporary employment (44). Further investigation is needed to establish the direction of effect and factors influencing men's mental health in this public service.

For the women's fully adjusted model, younger age, being unmarried, and high ERI were independently associated with high psychological distress, with ERI

making the major contribution. The results estimate that the prevalence of distress among those in the upper tertile of ERI was 20% for men and 22% for women. This finding, combined with longitudinal evidence of association (45), suggests that if attention is given to addressing the risk of effort-reward imbalance, there may be a related reduction in the risk of high psychological distress in the workplace. The reasons for the strength of the ERI contribution to the models are an area for further investigation. As an example, Tsutsumi and Kawakami (46) have proposed that extrinsic efforts (e.g. overtime, workload) and rewards (e.g. praise, development opportunities) can be a focus of organisational interventions to overcome imbalance. Few interventions have yet been developed based on improving ERI but early attempts show promise [e.g. (45)].

Overall, the models presented here suggest priorities for mental health intervention would include men in fixed-term or casual employment, younger workers and those experiencing high Effort-Reward Imbalance. Responses based on randomly sampled, weighted data identified correlates of high psychological distress that are reasonably consistent with other international studies, and provided direction as to sub-populations needing targeting through workplace mental health promotion strategies. These findings provide support for use of the K10 as a brief screening measure of psychological distress within an organisational context, providing appropriate guidance on interpretation is available.

3.5.1 Limitations

These study implications need to be examined in view of several limitations. First, participation rates were below 30% for both of the public sector surveys, though these rates are typical for the field (3). A key strength of this study is the use of weighting procedures to help control for response bias in the researcher survey. In comparison, the employer survey was unweighted and may not have provided a reliable indication of psychological distress prevalence in this public sector workforce. Second, it is possible that the differences in survey data collection methods are biasing the results. However, Mealing and colleagues have argued against this position (47), finding that

relative risk estimates were consistent for studies of the same population with different methods of data collection, response rates and sampling methods as long as survey questions were the same. A recent study has also found no significant differences between response rates, or types of responses to questions whether surveys were perceived to be anonymous or not (48). We acknowledge that the population studies we have used as comparators may have underestimated the prevalence of psychological distress due to non-response bias (18). However, we required points of adjudication because the workforce survey results were conflicting and these norms were the best estimates available. Third, this study is cross-sectional and the direction of relationships cannot be established. Kolstadt and coworkers (49) have also suggested that reporting bias can inflate associations between self-reported job-strain and depression, and a work unit analysis may show weaker associations than those found here. Finally, there is room for improvement in the types of measures applied in this study. For instance, our study used the socioeconomic variable ‘annual salary’ as a proxy measure for income, which may be an underestimate for occupations with allowances and overtime (e.g. police, nurses). Future measurement of additional contextual measures also seems likely to strengthen our understanding of the variables discriminating high from low psychological distress in public sector workforces.

3.5.2 Implications for practice: how should these findings be used?

After the employer survey was conducted, this public sector organisation acted on the findings by implementing a mental health promotion strategy that was predominantly focused upon general education about mental health. The impact of this approach is yet to be determined as follow-up data collection is underway, but this study suggests a greater reduction in risk may be obtained if specific sub-populations with poor mental health (i.e. men and younger workers) and people with high effort-reward imbalance are targeted.

Anonymous, volunteer surveys of worker mental health may be resource efficient and promote participation but this example suggests they may not advance management decision-making. Health Risk Appraisals for risk reduction rely on valid assessments of health outcomes. Inaccurate results could lead to expensive resource allocation that is ineffective in reducing the

risk of poor mental health in the workplace. In addition, mental health screening may also only be of limited use without the collection of at least some of the known important correlates (e.g. individual characteristics, psychosocial factors) to allow specific targeting of interventions. Clinicians have an important role in educating employers about mental health screening and giving advice on health survey interpretation.

3.6 Conclusions

Understanding the nature of workplace-based risks associated with poor mental health and addressing these risk factors is a pressing public health issue. Depression and anxiety screening forms part of a response to this challenge but this study showed that screening using typical employer survey methods with a validated measure could overestimate prevalence. Depression and anxiety screening should be promoted to employers and employees but guidance is needed on interpretation. In identifying priority groups for intervention, perceived work stress and a fixed term/casual employment contract may be particularly important among men.

3.7 Postscript

After this manuscript was published, feedback suggested that more conservative wording should have been used to describe prevalence as higher or lower rather than to imply that the employer data overestimated the prevalence of distress and other data sources did not. This point is important and is therefore acknowledged here.

This study collated and examined workforce data on psychological distress but it relied on self-reported information. In Australia, claims for workers' compensation typically involve an investigation process in which the facts and circumstances leading to work-related injury or illness are collected and assessed. These data are used for the development of policy and regulation on workplace health and safety in this country. Workers' compensation legislation in Australia also mandates that all claims data are forwarded by employers to the appropriate regulatory authority. This central repository

arguably represents a source of objective information that makes a factual connection between workplace psychosocial hazards and their subsequent mental disease outcomes.

As was noted in Chapter 1 regulatory data on trends and costs of mental disease claims for the Tasmanian government workforce had not been examined prior to the Partnering Healthy@Work project. Therefore the study in Chapter 4 was originally conceived to provide comparison with the self-reported data on workforce psychological distress.

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Chapter 4. Trends, costs and correlates of stress-related workers' compensation claims in a public sector workforce

Jarman L, Venn A, Martin A, Otahal P, Sanderson K. Trends, costs and correlates of stress-related workers' compensation claims in a public sector workforce. *Journal of Health Safety and Environment* 2014;30(2):243-358.

4.1 Preface

This chapter examines the features and costs of workers' compensation claims submitted by employees of the Tasmanian Government workforce between 2007 and 2011, dividing these claims into 'stress-related' and 'not-stress-related' categories. The study was originally conceived to assess whether claims for occupationally derived mental diseases in the workforce had features similar to those for self-reported high psychological distress. As the data were collected and analysed it became apparent there were systematic weaknesses in its regulatory capture that impeded its usefulness for researchers, employers and policy makers. These issues are discussed in a commentary paper (Appendix D).

The information presented in this chapter has been published in a peer-reviewed journal (1). The commentary paper is currently under peer review.

4.2 Introduction

Work disability due to poor mental health is a major public health and economic issue (2,3). Job stress is one of the important modifiable contributors to this burden (4). Countries around the world have attempted to reduce work-related stress illnesses and injuries by reforming Occupational Health and Safety (OHS) policy and regulations to prevent psychosocial risks and enhance the likelihood of return to work (RTW) (4,5). Despite the need to know whether these reforms are making a difference there are very few time trend

studies of stress-related (SR; also called mental or mental disease) compensation claims internationally.

Stress-related claims appear to have a pattern of low volume and high cost (6). High psychological distress has been estimated to affect about 5% of Australian workers (7) but only about 30% of people who took time off work for SR injuries proceeded to make a claim for compensation (8). In Canada, about 70% of the total cost of compensation claims has been estimated to derive from mental illness claims (9). Compensation insurers have also traditionally struggled to classify and discriminate the risks associated with work-related SR illness (10). This variability in classification means that small increments in SR claim rates can result in large increases in compensation insurance premiums (11).

One of the largest working populations impacted by work-related stress lies within the public sector (12). Inter-country statistics show that the public sector has proportionally higher reporting of SR illness than the private sector (12,13). For instance, the most recent information on incidence of mental diseases in the United States has highlighted that time off work is approximately 6 times higher in the public than private sector (14). Furthermore, at a time when SR and physical claim frequencies have been decreasing nationally in Australia (15), the Australian federal government had a 30% increase in the incidence rate of SR claims (11).

Stress-related claim rates have also been found to be highest for women, workers in higher-grade jobs, those in the 45-59 years age-group and employees in the health and community services sector (16). However, we do not know whether these factors are comparable between countries or sectors or if they are changing over time. In turn, this situation makes it difficult to benchmark rates for SR claims (17) and to profile people who are at risk of these claims.

Several studies using routinely collected longitudinal data have examined outcomes associated with claims such as injury recurrence (18,19), work absence following injury (20) and costs of musculoskeletal injuries (21). One retrospective Canadian study in a resource-sector workforce (6) examined total

incidence and costs of mental health claims between 2003 and 2006 but not changes over time for these outcomes. Time trend studies are available in some countries (22,23) but differences in legislation as well as methods and levels of reporting of injuries and illnesses makes comparisons challenging for compensation-related data (17). Studies examining time trends in specific countries and settings are therefore needed. This study was conducted with an Australian public sector employer that was experiencing significant increases in compensation premiums (24), and where claims were trending upwards compared with national norms (25). Inter-country workers' compensation statistics commonly present data based on physical illnesses and injuries (non-stress-related [NSR] claims) because legislation supporting acceptance of SR claims can vary considerably between regions. In view of the broad existing literature on NSR claims [e.g.(20,21,26)] we decided to use these claims as a heterogeneous comparator group for our study, which was primarily focused upon exploring SR claims.

Within this large and diverse public sector workforce we hypothesized that: 1) the rate of SR versus NSR claims had increased over time; 2) the total cost of SR claims was greater than NSR claims, with an increased SR cost-trend over time; and 3) the administrative dataset was able to adequately discriminate SR from NSR claims.

4.3 Method

4.3.1 Setting

This study was based in Tasmania, an island state of Australia with a population of approximately 500,000 people. The Tasmanian State Service (TSS) is one of the region's largest employers with approximately 30,000 employees and incorporates 14 government departments (e.g. health, education), occupations and locations (urban, rural, remote). As at 2011 the TSS had a mainly female (69%) staff, with 83% employees being permanently employed and 40% being 50 years or older. Ninety percent of employees were paid between AUD\$40,000 and \$90,000 per annum (27). Workers compensation is a legislated requirement for all Australian employers, operating under a 'no fault' system (28) and Tasmania has its own state-based

regulatory authority, WorkCover Tasmania. Claims can be lodged by employees who have a medically certified injury or illness substantially contributed by the work environment (29). Ethics approval for the study was obtained from the Human Health and Research Ethics Committee (Tasmania) Network (ID: H0012363).

4.3.2 Study design

Administrative data obtained from routinely collected TSS workers compensation claims were examined for the period from 1 July 2007 to 30 June 2011. This commencement date was established to coincide with the introduction of major changes in compensation legislation and its regulations in Tasmania (30).

Workers compensation dataset

A de-identified dataset on all workers compensation claims submitted by TSS employees during the period from 1 July 2007 to 30 June 2011 was sourced from the state government OHS authority, WorkCover Tasmania in May 2013. Accepted claims were defined as those claims with attributed costs whether or not they had lost time. At the time of data extraction, all ongoing claims were excluded from the index year, however the dataset did not contain identifying features to establish whether claims were recurrent, so it was not possible to examine differences in recurrent versus new claims. A total of 5851 claims were extracted.

4.3.3 Type of claim

The dataset included variables for type of claim (mental diseases, all other claims), claim report year, age, sex, Australia and New Zealand Standard Classification of Occupations (ANZSCO) code, leave days, type of cost, date of payment and mechanism of injury. Stress-related claims were derived from the 'mental diseases' category for allowed claims, which includes claims for anxiety or stress disorders, depression, anxiety and depression combined, reactions to stressors, unspecified mental diseases, and post traumatic stress disorder (PTSD). All other types of claims were defined as 'not-stress-related' (NSR).

Claim characteristics and costs

A ‘claim duration’ variable was created by calculating a notional ‘closed date’ where no further claims for costs had been made within a 6-month period. Costs are defined as ‘everything paid out in a financial year, regardless of claim report year’. Cost variables included payments to doctors (including psychiatrists), hospitals, vocational rehabilitation services, allied health providers, wages, miscellaneous (e.g. travel, accommodation), investigation and legal expenses (borne by the employer). The costs presented here are net costs in Australian dollars, separated from costs able to be reimbursed by other forms of insurance. Costs were reported in financial years to allow for conversion to constant prices for the periods 2007-08 to 2010-11 (31). ‘Total cost’ was the sum of all individual costs associated with a claim. Details of service provision associated with costs were not supplied within the dataset.

Mechanism of injury for stress claims

Mechanism of Injury refers to the Type of Occurrence Classification System (ToOCS 3rd Edition) coding of the claimant’s written description of how the injury or disease occurred. The Mechanism of Injury coding variables were: work pressure (deadlines, responsibilities, restructuring, interpersonal conflict, performance based management), workplace harassment and/ or workplace bullying (repetitive assault, harassment, abuse, threats), other (exposure to a traumatic event, exposure to workplace or occupational violence, suicide or attempted suicide, other harassment, other mental stress factors).

Socio-demographic and work characteristics

With the exception of cost modelling age was analysed in ranges (16 to 34 years, 35 to 44 years, 45 to 54 years, 55+ years). ANZSCO sub-categories were manually reviewed to create new themed categories that enabled comparisons with existing TSS industrial award categories that had been established in earlier research (32). We subsequently categorized occupation as blue collar (e.g. manual work), white collar (e.g. administrative work), service (e.g. nurses, teachers, police, community service and emergency service workers), professional (e.g. professionally titled) and manager.

4.3.4 Statistical analysis

Summary estimates are shown as mean (sd) and median (interquartile range) where data were skewed. All analyses were stratified by sex because men and women experience and express mental health issues in different ways (33). Rates of claims were calculated as a count of SR and NSR related claims per annum, per 1000 employees stratified by sex, age-group and year of claim. The organisation did not have centralised records of headcount by occupation-type at the time of data extraction so claim rates could not be calculated for this category

We used Poisson regression with a population offset to investigate hypothesis 1, which investigated time trends in SR and NSR claims. Rate ratios (RR) of claims were calculated by sex for age-group and report year plus an interaction term; *'age-group x report year'*, with the term's contribution being examined via a Likelihood Ratio test. Report year was included in the model as a continuous variable and regression slopes were then predicted using this interaction term, which allowed us to identify whether the rates of claims were changing over time within each age-group. Population denominator information was not available by occupation and mechanism variables, and models without the population offset were used to calculate rate ratios where these variables were examined in models.

Cost-based regression models were constructed by sex to test hypothesis 2, which examined the trends and features of costs associated with claims. We first assessed the univariable association between the outcomes of: a) total cost and b) individual costs, and the variables 'type of claim', age, occupation and report year. As the distributions of cost data violated the normality and homoscedasticity assumptions of linear regression we used quantile regression [29] to model differences in medians. Variables that were significant in the univariable analysis (age, claim type) were included in the multivariable model, neither occupation nor report year were significant however report year was included due to its critical role in distinguishing between SR and NSR claims. WorkCover data on occupation were also tested for inclusion in the cost-based multivariable model but was not significant and did not alter the effects of other variables so was excluded from the final model. The second

stage of analysis entered type of claim, age, report year at once and the final stage added the interaction term '*type of claim x report year*'. For variables with multiple categories we used a Wald test to assess the effect of interaction for all levels of the variable simultaneously and then predicted marginal median costs for the type of claim and report year at median age.

Hypothesis 3, which tested whether administrative dataset was able to adequately discriminate SR from NSR claims was assessed with log binomial regression to measure the Prevalence Ratio (PR) by sex using the methods for selection of covariates as described above. The area under the Receiver Operating Characteristic Curve (ROC) was calculated by using logistic regression, entering the covariates (age, occupation) one at a time and conducting a Wald test upon each variable's entry to determine if that variable significantly ($p < 0.05$) increased model discrimination of SR from NSR claims. ROC calculations need to be greater than 0.7 to provide adequate discrimination (34). All analyses were conducted using STATA 12.1 (StataCorp LP, Texas, USA).

4.4 Results

4.4.1 Overview of claims

Stress-related claims represented 14% (728/5131) of all workers compensation claims in the workforce during the 1 July 2007 to 30 June 2011 period.

Women, who represented a greater number of employees in this workforce (35), submitted a higher proportion of compensation claims than men during the 4-year period examined. Table 4-1 shows that the average age of claim submission for SR claims was slightly higher for women (47 years) than men (46 years) but similar for NSR claims (45 years). Table 4-1 also indicates that the rate of both SR and NSR claims was consistently higher for men than women across all years.

Table 4-1. Distribution of workers compensation claims within the Tasmanian State Service during the period 1 July 2007 to 30 June 2011 by type of claim, sex, age, year, leave days, occupation and rate.

	Men (N)		Women (N)	
	Stress-Related	Not Stress-Related	Stress-Related	Not Stress-Related
Total claims	246	2050	482	3081
Age, mean years (SD)	46.3 (9.4)	45.1 (10.9)	47.4 (9.2)	45.3 (11.0)
Claims by Age				
16-24 years	4	72	5	148
25-34 years	26	291	44	400
35-44 year	60	558	101	735
45-54 years	106	687	225	1157
55+ years	50	442	107	641
Claims by Occupation				
Blue Collar	22	456	26	463
Admin	29	593	40	393
Service	169	846	374	2005
Professional	16	111	28	157
Manager	11	44	15	65
Claim Report Year				
2007-08	62	515	113	751
2008-09	59	478	124	819
2009-10	47	504	124	743
2010-11	78	553	121	773
Claims Rates ¹				
2007-08	6.60	54.83	5.44	36.15
2008-09	6.21	50.27	5.76	38.05
2009-10	4.95	53.11	5.69	34.09
2010-11	8.34	59.16	5.68	36.26
Leave Days				
Median (p25/p75) ²	36 (9/80)	1 (0/7)	37 (5/81)	0 (0/6)

¹ Rates of compensation claims per 1000 employees

² Interquartile range: 25th and 75th percentile

The ‘service’ occupation provided the highest proportion of SR claims, totalling 74% (543/730) across all years (Table 4-1). Even though 13% of SR claims and 50% of NSR claims had zero leave days, these claims were included in the analysis because they incurred significant additional expenditures for cost categories where no time had been lost. On average, SR claims accounted for 81% (360/442) of all compensation-related leave-days in the 4 year period. Men had a median of 36 (percentile [p] 25 = 9/ p75 = 80) leave-days and women 37 (p25 = 5/ p75 = 81) leave-days per SR claim. Median costs associated with zero leave-day claims were \$484 (p25 = \$174/ p75 = \$2970) for men and \$683 (p25 = \$185/ p75 = \$2661) for women. The

median duration of SR claims was 243 days (p25 = 121/p75 = 547) and NSR claims was 61 (p25 = 0/p75 = 242) days. The proportion of total workers compensation costs for SR claims ranged from 72.6% (\$28,801/\$39,670) in 2007-08 to 82.7% (\$32,908/\$39,788) in 2009-10 (see Table 4-2).

Table 4-2. Median costs (AUD\$) expressed as constant prices for workers compensation claims commencing during the period from 1 July 2007 to 30 June 2011.

	2007-08 \$ median (p25/ p75) ¹	2008-09 \$ median (p25/ p75)	2009-10 \$ median (p25/ p75)	2010-11 \$ median (p25/ p75)
Doctor				
Stress-related	609 (161/ 2099)	1025 (299/ 2610)	1330 (328/2834)	-
Not stress-related	157 (57/ 405)	178 (77/ 424)	183 (80/ 502)	-
Rehabilitation ²				
Stress-related	1832 (0/ 4889)	2767 (827/ 6007)	3806 (727/ 8395)	3051 (0/8893)
Not stress-related	-	0 (0/ 526)	0 (0/ 644)	-
Allied health				
Stress-related	-	-	0 (0/14)	-
Not stress-related	76 (0/ 515)	102 (0/ 525)	95 (0/ 630)	164 (0/747)
Travel/ Accommodation				
Stress-related	0 (0/12)	0 (0/ 169)	0 (0/ 73)	0 (0/159)
Not stress-related	-	-	-	-
Weekly wages				
Stress-related	6467 (1473/ 18255)	8901 (1660/ 18362)	8974 (1554/ 24621)	9000 (1444/ 23764)
Not stress-related	165 (0/ 1241)	218 (0/ 1509)	214 (0/ 1522)	0 (138/ 1783)
Legal expenses				
Stress-related	0 (0/ 592)	0 (0/ 769)	0 (0/.653)	0 (0/ 526)
Not stress-related	-	-	-	-
Investigation expenses				
Stress-related	950 (0/ 1831)	1276 (0/ 3397)	1364 (0/ 3247)	1395 (0/ 3315)
Not stress-related	-	-	-	-
Total expenses				
Stress-related	11047 (2401/ 26984)	15822 (3812/ 27750)	14905 (5302/ 37477)	13130 (2994/ 35157)
Not stress-related	689 (215/ 2982)	782 (248/ 3712)	868 (236/ 4540)	756 (148/ 4431)

¹ Interquartile range: 25th and 75th percentile

Work pressure was the most common type of mechanism of injury cited across all financial years for SR claims, accounting for 59% (433/730) of all SR claims.

4.4.2 Time-trends for stress versus non-stress claims

Stress-Related and NSR claims were modelled separately by sex, adjusting for age category and report year. There was no significant difference ($p>0.05$) in the rates of SR claims (per 1000 employees) over time for either men or women (not shown below). The age by year interaction term was not significant in SR models, however there were significant differences between age-groups for NSR claims over time. Therefore all estimates were predicted from models including the interaction to enable direct comparison with NSR claims, and these models are shown in Figures 4-1 (men) and 4-2 (women).

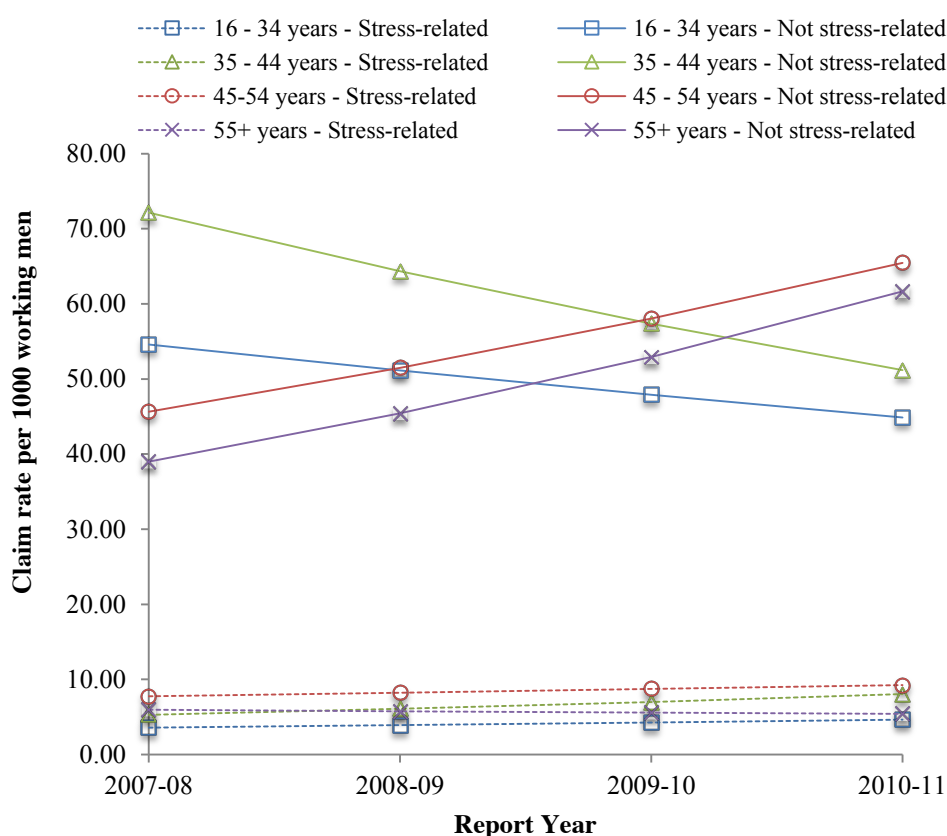


Figure 4-1. Predicted rates of compensation claims per year per 1000 male employees of the Tasmanian State Service stratified by age-group, during the period from 1 July 2007 to 30 June 2011.

For men and women submitting NSR claims, models (represented pictorially in Figure 4-2) showed that the direction and rates of claims were changing over time according to age-group ($p < 0.01$), with claim rates increasing for employees 45 years and over, and declining in the 25 to 34 age-group.

For women who made NSR claims, a modest downward trend in claim rates (slope = 0.94, $p = 0.048$) (see Figure 4-2; models not shown) was found for claimants aged 25 to 34 years ($p < 0.05$).

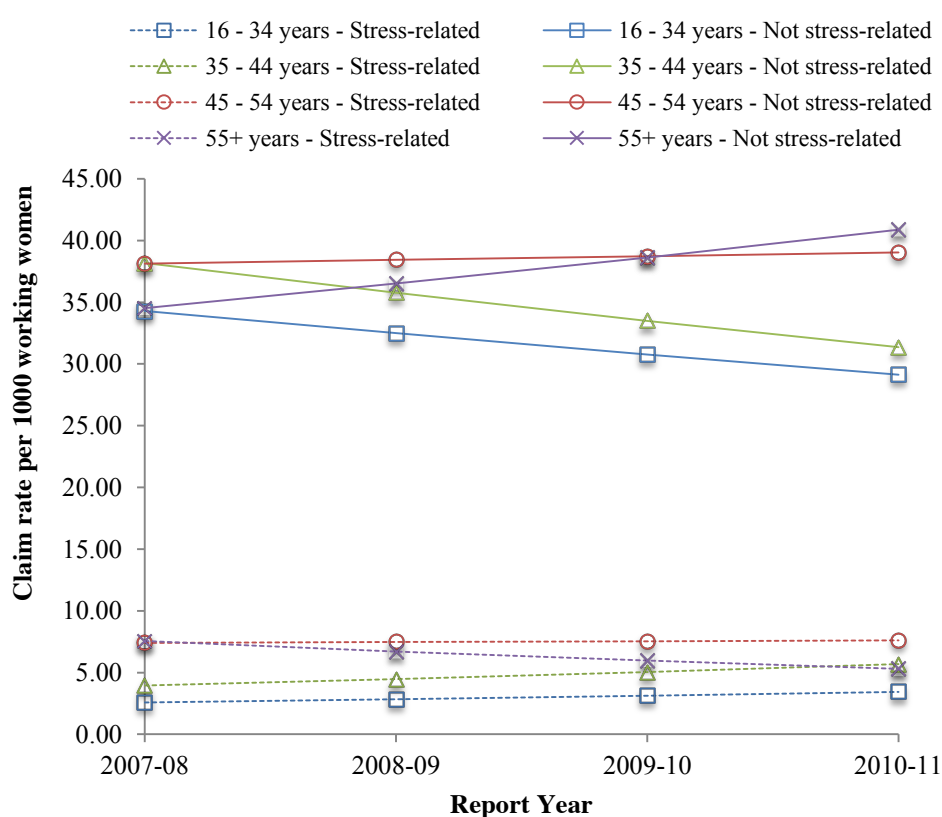


Figure 4-2. Predicted rates of compensation claims per year per 1000 female employees of the Tasmanian State Service stratified by age-group, during the period from 1 July 2007 to 30 June 2011.

For ‘mechanism of injury’, Poisson models for SR claims (not shown) without a population offset, adjusted for age, occupation and report year had higher rate ratios for both sexes associated with ‘work pressure’ (men = 2.74, 95%CI 1.91-

3.92, $p < 0.001$; women = 3.54, 95%CI 2.76–4.53, $p < 0.001$) and ‘other’ (men = 1.97, 95%CI 1.34–2.90, $p = 0.001$; women = 1.31, 95%CI 0.97–1.76, $p = 0.073$) compared with ‘bullying’ (reference variable). An interaction between ‘mechanism x report year’ was not significant ($p > 0.05$) for either sex. No direct comparison was possible with NSR claims for mechanism of injury due to differences in response categories between the two types of claims.

4.4.3 Cost trends for stress versus non-stress claims

The median cost of SR claims was AUD\$10,379 higher for men and AUD\$10,687 higher for women than that of NSR claims. The quantile regression models (pictorially represented in Figure 4-3) for men and women showed that total payments were associated with SR claims, age and report year. No evidence of a change over time was found for total NSR costs across the four years examined for either sex. An overall change in total cost was identified for both sexes for SR claims ($p < 0.001$; model not shown) but there was no clear time trend as costs fluctuated year-to-year (see Figure 4-3).

Median wages (\$8,482, p25 = \$1,885/ p75 = \$21,581) and doctor payments (\$201, p25 = \$0/ p75 = \$1,626) were associated with SR claims for men (Table 4-2). Models for women (analysis not shown) showed the same SR claim associations with median wages (\$8,363, p25 = \$1,334/ p75 = \$20,950) and doctor payments (\$452, p25 = \$0/ p75 = \$1,911). Wages costs fluctuated significantly over time for SR claims but not for NSR claims (Figure 4-3). No overall time trends were apparent. Compared with NSR claims, doctor costs were significantly higher for men with SR claims but were stable over time for both types of claims. For women, median doctor costs were stable over time for NSR claims but fluctuated between years for SR claims.

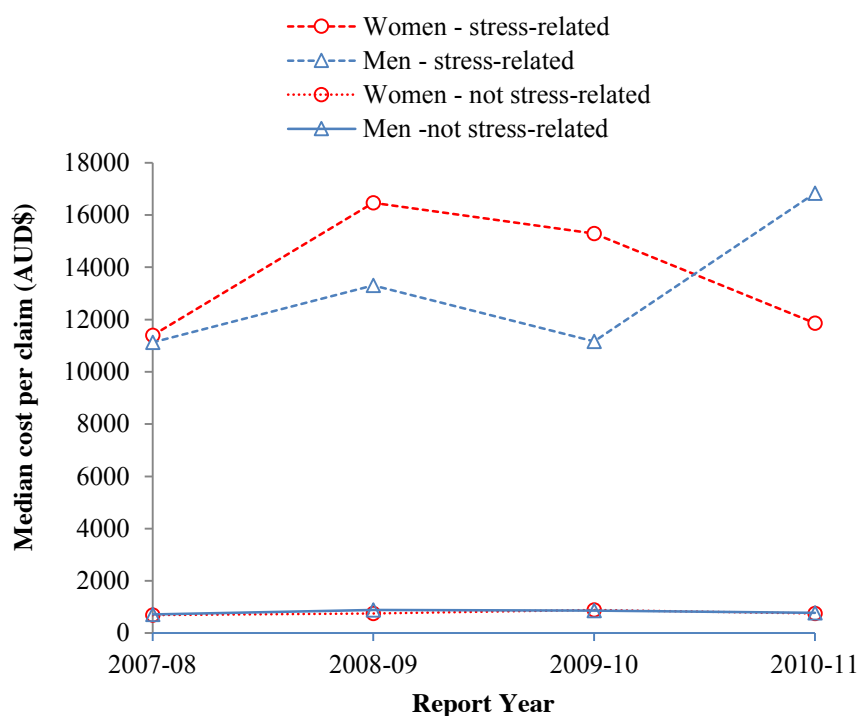


Figure 4-3. Median cost per workers compensation claim expressed as constant prices by financial year for Tasmanian State Service employees during the period 1 July 2007 to 30 June 2011.

Note: The model has been adjusted for age and year of claim.

Several types of costs, namely hospital payments, allied health payments, equipment, legal and miscellaneous expenses had too few cases to perform regression analyses comparing costs by type of compensation claim. Cases with vocational rehabilitation payments and investigation expenses were normally distributed for SR claims but had few examples for NSR claims. Median costs for vocational rehabilitation associated with SR claims were higher for women (\$2,895, p25 = \$444/ p75 = \$7,048) than men (\$2,724, p25 = \$225/ p75 = \$5,719). Investigation expenses had a median of \$1,166 (p25 = 0/p75 = 2730) for men and \$1,247 (p25 = 0/ p75 = 3239) for women for SR claims.

4.4.4 Discrimination of SR claims in the administrative dataset

The univariable analysis for women iterated stronger associations by age-category than those for men (see Table 4-3). The strength and directions of

univariable associations by occupation were similar for men and women, with emphasis on lower claim prevalence for blue and white-collar workers.

Table 4-3. Univariable analysis of associations between demographic variables and stress-related compensation claims for men and women in the Tasmanian State Service during the period 1 July 2007 to 30 June 2011.

<i>Variables</i>	Men		Women	
	PR ¹ (95% CI)	<i>p</i> ²	PR (95% CI)	<i>p</i>
Age (years)				
16-24	1.00	-	1.00	-
25-34	1.56 (0.56 – 4.33)	0.395	3.03 (1.22 – 7.51)	0.016
35-44	1.84 (0.69 – 4.93)	0.222	3.70 (1.53 – 8.92)	0.004
45-54	2.54 (0.96 – 6.70)	0.060	4.98 (2.09 – 11.90)	<.001
55+	1.93 (0.72 – 5.19)	0.192	4.38 (1.82 – 10.55)	0.001
Occupation				
Blue Collar	0.28 (0.18 – 0.43)	<.001	0.34 (0.23 – 0.50)	<.001
Admin	0.28 (0.19 – 0.41)	<.001	0.59 (0.43 – 0.80)	0.001
Service	1.00	-	1.00	-
Professional	0.76 (0.47 – 1.23)	0.262	0.96 (0.68 – 1.37)	0.843
Manager	1.21 (0.70 – 2.08)	0.499	1.19 (0.75 – 1.90)	0.452

¹ PR, Prevalence Ratio.
² p-value for interaction between variable and stress-related claims using logistic binomial regression.

Log binomial regression modelling (Table E-2) indicated limited capacity to discriminate between SR and NSR claims for both men (ROC = 0.67) and women (ROC = 0.60).

4.5 Discussion

In this workforce, SR claims consistently represented around 14% of all claims submitted by report year but contributed about 35% of all estimated compensation costs per annum. This finding suggested that small changes over time in the rate of SR claims could have larger implications for associated costs.

Overall, we found little change in the rate of SR claims over time but some differences for rates of NSR claims during the 4-year period examined. Our research also found that the rates of SR claims submitted by men and women were similar in this administrative dataset. Men had higher rates of NSR claims than women in this workforce. Although the sex differences for NSR

claims were expected, women have previously been found to have higher SR claim rates (6). In industries that have imbalance in the proportion of male and female employees, such as the public sector, this finding shows the importance of rate-based rather than frequency-based calculations (e.g. (15)) in accurately determining the sub-populations at risk of claiming for compensation.

Stress-related claims were typically submitted by people 45 years and over, whereas NSR claims were most likely within the 35 to 44 year age range. In this study, men and women who were 25 to 34 years had decreasing trends of NSR claims and this finding is consistent with national trends (36). However men who were 45 years and over have been submitting NSR claims at an increasing rate over time. Recent studies have suggested that reports of physical injury in older workers are a direct reflection of current exposure to risk (37) and may have a strong correlation with psychosocial factors (38). Stress-related claims tend to be made by older workers (6,20), who are less likely to successfully return to the workforce and may have ongoing disability (39). Therefore it seems that this sub-population of older workers may continue to be at risk of making compensation claims.

In examining the reasons given for making SR compensation claims, work pressure reliably accounted for almost 60% of claim occurrence in each year examined. This proportion is consistent with causes of reported SR illness in the United Kingdom (40) and SR claim statistics in Australia (15). It is possible that the ‘work pressure’ variable is acting as a proxy measure of job demands in this dataset (41) and if so, the result is not unexpected due to the intensification of modern public sector work (42). However, the relatively narrow scope of the work pressure definition applied here gives few clues as to the psychosocial risks that could have led to job strain.

We also found that models of SR claim costs, adjusted for age and report year, were approximately \$10,000 higher (median) for men and \$11,000 for women per claim than NSR claims. We identified that the median costs associated with these claims show neither an upward nor a downward trend in the four years examined but did fluctuate significantly between years. However, we acknowledge that there could be significant fluctuations between sub-categories within NSR claims, which are not reported here. Wages and

doctors' fees were key contributors towards total costs for the SR claim models for men and women with wages in particular varying over time.

The cost variables 'vocational rehabilitation' and 'investigation expenses' were mostly associated with SR claims within this population and also contribute to the higher median values for this type of claim. Investigation processes typically involve an assessment of work environment factors contributing to injury and illness claims, and these costs may reflect the more complex aetiology of stress versus non-stress claims.

We acknowledge there are limitations associated with this study. The dataset did not capture claim recurrence and we are unable to speculate whether the presented data are impacted by second claims, and if so how recurrent claims may differ from initial claims. Although data on recurrence have been published elsewhere (18,19,43), this dataset highlights that recording second claims is not a consistent practice across regulatory jurisdictions. Clearly, this is an important issue for regulators internationally because we only have sporadic evidence on how policy and legislation are impacting claim recurrence. Inspection of the variables available in the dataset highlighted they provide inadequate description of job-related psychosocial hazards. The limited capacity of our models to discriminate between SR and NSR claims using the available variables suggests key correlates are not being measured. Age, sex and occupation have given some clues as to the aetiology of SR claims but the socio-demographic descriptors seem restricted and the categorization under the 'work pressure' variable appears outdated compared with more recent descriptions of psychosocial hazards (44). This variable range and category restriction is not unique to Australian jurisdictions but is evident in centralised databases internationally as well [e.g. (40,45)]. We acknowledge that the NSR category was very diverse and could have had large variations between types of physical illness and injury. However, our focus was upon exploring SR claims and their costs. More in-depth comparisons with NSR claims or outcomes such leave-days would be a natural extension of this research. Costs could have been calculated on a 'year-post-claim acceptance' however we decided that comparisons of median values across years minimized method bias (46) associated with the timing of claim submission within a financial year. Finally,

we acknowledge that longitudinal data collected prior to the 2007-08 year could have provided more comprehensive assessment of claim trends but the influence of legislation changes and impact of recurrent claims in this dataset would have made interpretation challenging.

4.5.1 Implications and considerations for future research

This study also has a number of important implications for practice and future research. The centralised records used here were an excellent potential resource for benchmarking and provided some basic information on SR claims.

However they required a sophisticated analysis to obtain high quality information on trends and costs. Rate-based, rather than frequency calculations of these datasets are essential to accurate risk assessment. This issue becomes particularly important in the case of SR claims, where small rate increments can have exponential increases in compensation premiums. A further repercussion of frequency-based reporting, which has been the usual output in published Australian compensation data was that we were unable to benchmark our results to those of other public or private sector organisations. As a result the proportions of SR claims submitted by private and public sector workers in Australia remains unclear. In addition, although our data provide clues about the characteristics and costs of SR claims in this state public sector organisation, without benchmarking we cannot generalize our findings more broadly. This situation inhibits sound policy making at both a regulatory and organisational level.

Clearly, if we are to make inroads on the issue of SR claims there is plenty of work ahead. We recommend that regulators, insurers and employers work together to broaden the range of variables captured by centralised databases on SR claims to include factors such as claim recurrence, socio-demographic information, job-related psychosocial hazards and the outcomes of decisions on claims. For example, greater detail on sub-factors associated with the ‘work pressure’ category of SR claims would enable these data to be used as indicators within psychosocial risk evaluations (47). Better profiling of claims will enable specific strategies to be developed for ‘at-risk’ groups, such as older workers. Furthermore, we believe that published information supplied by

regulators would benefit from more in-depth reporting of rates and time-trends, which should be stratified by sex due to differences in the ways that men and women report mental health (48). These changes will enable better benchmarking, and within- and between- organisation analysis of work factors influencing the submission of SR claims. Finally, by conducting further research on unique SR costs, such as vocational rehabilitation, in combination with time-trends on SR claim rates it may be possible to assess the cost-effectiveness of services associated with stress-claim rehabilitation.

4.6 Conclusions

In conclusion, our results show no change in the rate of SR claims over time and increasing NSR claim rates for older men in this Australian public sector workforce. These trends have implications for the ongoing burden of injury and its associated costs for the public sector employer. Our cost models show that SR claims are significantly higher in overall costs, and have uniquely contributing costs that need further investigation. The variables contained in this administrative dataset did not adequately discriminate SR from NSR claims.

4.7 Postscript

In reviewing the content of this manuscript, the wording used for Hypothesis 3 could have been clearer, so rather the word ‘discriminate’ was replaced with ‘predict’ or ‘classify the features of workers compensation claims’. The present wording is confusing because Hypotheses 1 and 2 presumed SR claims were identifiable and thus discriminated from NSR claims in the dataset. As was noted in section 4.2, researchers have been unable to profile people at risk of submitting SR compensation claims. Therefore the intent of Hypothesis 3 was to assess whether the dataset held sufficient characteristics to enable prediction of SR compensation claims.

As was noted in Chapter 1, significant inroads have been made into the causes of occupationally derived mental diseases. Apart from the trended data presented above, this study also identified that Australian legislation and regulation have not kept pace with this research. An outstanding question of

interest is whether the aforementioned changes in legislation and regulations had an impact over the period 2007 to 2012. The case study in Appendix D investigates this issue further, identifying weaknesses in legislation wording and psychosocial hazard identification, highlighting employer legal obligations pertaining to job stress, and making recommendations for change. In particular, this Appendix infers that Australia does not presently have the capacity to accurately assess the effects of policy-level changes on stress-related compensation. These factors are fundamental points of intervention if inroads are to be made in reducing the incidence of stress-related work disability, and provide lessons that can be extended to regulation in other countries.

Having established benchmarks for psychological distress in Chapter 3, and identified the features and costs of stress claims in Chapter 4, the next chapter moves forward in time to analyse workforce mental health at the conclusion of Partnering Healthy@Work.

4.8 References

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Chapter 5. Workplace health promotion and mental health

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5.1 Preface

As was discussed in Chapter 1, if we are to promote and protect mental health at-scale, population-level evidence is needed of what works at-scale. This chapter examines whether comprehensive workplace health promotion (WHP) was related to workforce mental health, and whether this type of intervention could contribute to a difference in mental health outcomes at-scale.

5.2 Introduction

A recent meta-analysis based on 174 large-scale mental health surveys across 63 countries calculated that common mental disorders [CMD] (e.g. anxiety, depression, substance abuse) were experienced by 18% of adults within the past 12 months and 30% of adults over their lifetime [1]. Approximately two-thirds of people with a CMD are employed with significant repercussions for labour productivity and economic growth [2], health and welfare systems, community functioning and societal equity [3]. The cost of CMDs has been forecast at \$16 trillion over 2012-2032 [2].

Reducing this burden of CMDs in the workforce requires a multi-component approach including both preventive and disease-management interventions [4 5]. Universal workplace interventions directly targeting mental health can be effective in reducing symptoms of depression [6 7]. There is also increasing recognition that occupational health programs targeting modifiable health risk factors such as physical activity and nutrition may also have benefits for mental

health [8 9]. A meta-analysis has shown that employee mental health can benefit from health promotion interventions that either directly target mental factors or operate through indirect pathways focused on modifiable lifestyle risk factors (e.g. lifestyle choices individual behaviours, changes to the work setting) [10].

Comprehensive workplace health promotion (WHP) simultaneously addresses a range of health-risk factors that may impact health, wellbeing and productivity. It considers mental and physical health (individual factors) as well as the need to make work structures supportive of health-promoting choices (organisational factors) [11]. As such this framework can include important mental health strategies such as access to mental health services, stigma elimination, and improved mental health literacy [12]. Evaluation research on interventions incorporating individual and organisational components is complex and challenging and as a result such studies are rare [13].

Benefits from WHP rely on well-designed, multi-component programmes that are sustained via an embedded health-promoting workplace culture [14]. To be effective in addressing chronic illness, WHP needs to include health screening, provide programmes addressing multiple risk factors (e.g. physical inactivity, smoking, stress and poor nutrition) [15] and be supported through work environment changes encouraging health promoting choices [16]. Good quality recruitment strategies into WHP programmes also play an important role so that there is broad employee participation. Programmes need to be available and accessible to participants [17], and attract people at risk of poor health rather than just selective participation from the ‘worried well’ [18].

A small number of studies have been published on comprehensive WHP but have: i) tended to focus on measuring lifestyle risk factors only [19]; ii) concentrated on a certain segment of an organisation [20]; or iii) used proxy indicators of mental health such as job stress [21]. We were unable to identify any studies that evaluated the effects of comprehensive WHP in relation to mental health outcomes.

This article describes the Healthy@Work WHP initiative and assesses changes in population mental health over a 3-year period. Healthy@Work was based upon best-practice principles for comprehensive WHP [22], and implemented in a large and diverse public sector workforce located in regional Australia. Public sector (government) workers are of interest because research has shown mental health problems, including job stress are more prevalent in the public than private sector [23 24]. Our research questions were: i) which interventions were implemented in Healthy@Work that could have benefitted mental health; and ii) what was the association of these interventions with psychological distress over the 3-year evaluation period? We examined both the availability of (reach), and participation in (dose) WHP because positive mental health effects have been identified for health-promoting environments [15] as well as activity-based participation [25].

5.3 Method

5.3.1 Study design

The study used a repeated, randomly-selected cross-sectional workforce survey design with a cohort subgroup occurring by chance. Survey measures have been described previously [26].

5.3.2 Setting and description of Healthy@Work

This research was conducted in Tasmania, an Australian state with a population of around half a million people. In mid-2008, the Tasmanian Government made a 3-year commitment (2009-2012) to implement health and wellbeing programmes within its own public sector workforce, which was comprised of around 28,000 employees working around the state (urban, regional and remote) in a diverse range of organisations (e.g. health, education, police, forestry, electricity) and occupations. Over \$2 million was committed to this ‘Healthy@Work’ project, which commenced in November 2008. A December 2008 initial audit of workplace health and wellbeing activities within this public sector workforce showed that 6 of its 15 government organisations (also called departments) had a programme in place. The average number of

initiatives per department increased from 13 to 48 after 3 years; with most increases reported in the final year [27].

The goal of Healthy@Work was to support the development of health promotion programmes across its entire workforce that improved the health and wellbeing of all employees. It was intended to be a high quality programme framework that was devolved to departments through a mandated directive from the elected head of government. Key values associated with Healthy@Work were equity of access, leadership commitment, sustainability, targeting of key priorities, organisation-based strategies, framework flexibility and evaluation. Intended outcomes included

- vi) improved health and wellbeing in relation to physical activity, nutrition, alcohol consumption, smoking and psychosocial factors (including mental health and stress),
- vii) increased employer and employee awareness of health and well-being issues,
- viii) improvement in workforce health and wellbeing policies and programmes within the Tasmanian Government. Programmes were to target the work environment as well as individuals,
- ix) employee-valued workplace health and wellbeing programmes, and
- x) making healthy choices easy choices within the workforce.

5.3.3 Participants

For both of these self-report surveys we selected a 40% random population sample from the total pool of employees, stratified according to employment condition (permanent, fixed-term/ casual), employment category (full-time, part-time) across the departments. Survey responses were linked with administrative human resource data. By chance a portion of the population was re-surveyed and responded twice (men = 161; women = 423) and this group is referred to as the 'cohort'. Figure 2-1 shows sampling processes and responses to these surveys.

5.3.4 Variables

In each survey, participants were asked to indicate which Healthy@Work activities and supports were available in their workplace by giving a ‘yes’ or ‘no’ answer to a list of WHP initiatives that were listed separately in 2010 but then categorized into groups in 2013 as health assessments (e.g. health checks), mental health and well-being programs (e.g. stress management, employee assistance programs, relaxation, education), health education (e.g. seminars), physical activity programs (e.g. sessions, sports teams), injury prevention/rehabilitation, health policies (e.g. flexible work) and amenities (e.g. physical space for health-activities, healthy food options, access to stairs, health information bulletins). In 2010 the reporting time-frame was ‘the previous 12 months’ and in 2013 it was ‘previous 3 years’ to cover the duration of the intervention. Where a respondent gave a ‘yes’ answer, they were also asked to write the number of times they had participated in activities.

We counted the number of positive responses each person provided for the availability question to give an indication of total availability of Healthy@Work (22) and calculated times participated to represent participation (23). Total availability was classified into one of 3 groups: 1) *mental health* - availability of activities directly targeting individual mental health and well-being (e.g. mental health education, stress management); 2) *lifestyle* - individually targeted activities targeting known risk factors associated with poor mental health (i.e. health education, health assessments, physical activity, injury support); 3) *organisational* - workplace initiatives indirectly targeting mental health (i.e. changes to amenities, health-promoting policies). Organisational change and system job stress was not part of Healthy@Work so system interventions targeting work organisation and psychosocial factors were not recorded. Participation was classified into mental health and lifestyle categories only, which were then added together to form a mean total participation score.

5.3.5 Measures

Outcome

The mental health outcome was psychological distress, which was measured using the Kessler-10 (K10), which ranges from 10 (lowest distress) to 50 (highest distress) [28]. Variants of the K10 have been used in employed cohorts [23–29] and the 10-item version has good precision detecting clinically diagnosable CMDs (e.g. anxiety and depression) in the high to very-high range of diagnosis [28].

Workplace Health Promotion initiatives (exposures)

In each survey, participants were asked to indicate which Healthy@Work activities and supports were available in their workplace by giving a ‘yes’ or ‘no’ answer to a list of WHP initiatives that were listed separately in 2010 but then categorized into matched-item groups in 2013 as health assessments (e.g. health checks), mental health and well-being programs (e.g. stress management, employee assistance programs, relaxation, education), health education (e.g. seminars), physical activity programs (e.g. sessions, sports teams), injury prevention/rehabilitation, health policies (e.g. flexible work) and amenities (e.g. physical space for health-activities, healthy food options, access to stairs, health information bulletins). In 2010 the reporting time-frame was ‘the previous 12 months’ and in 2013 it was ‘previous 3 years’ to cover the period of the intervention (Appendix A). Where a respondent gave a ‘yes’ answer, they were also asked to write the number of times they had participated in activities.

We counted the number of positive responses each person provided for the availability question to give an indication of total availability of Healthy@Work and calculated times participated to represent participation. Total availability was classified into one of 3 types of WHP intervention: 1) mental health - availability of activities directly targeting individual mental health and well-being (e.g. mental health education, stress management); 2) lifestyle - individually targeted activities targeting known risk factors associated with poor mental health (i.e. health education, health assessments, physical activity, injury support); 3) organisational - workplace initiatives

indirectly targeting mental health (i.e. changes to amenities, health-promoting policies). System interventions targeting work organisation and psychosocial factors were not recorded as they were not included in Healthy@Work. Participation was classified into mental health and lifestyle categories only, which were then added together to form a mean total participation score.

5.3.6 Statistical analysis

Analyses were stratified by sex due to known differences in the way that men and women self-report mental health[30], which were evident in the 2010 survey data [26]. Repeated cross-sectional analysis (described in more detail below) was treated as a two-stage process involving i) assessing whether WHP availability and participation changed over time, and ii) assessing whether mean K10 scores were different over time and then estimating associations between the K10 and exposure to Healthy@Work programs at 2010 and 2013. Survey responses were anticipated to be more similar within than between government departments, and for those who were repeat respondents. Accordingly we used mixed-effects linear modelling with random intercepts for department and participants to allow for related responses. In stage 1, we used Poisson regression with random effects to assess whether mean availability of WHP programs or participation in those programs had changed over time. Model diagnostics from linear mixed effects models showed that residuals were skewed and an inverse transformation was applied to the K10 values. We then back-transformed the K10 to present mean estimates on the original scale of measurement. Further we applied propensity weighting as described by Little and Rubin [31] to deal with potential non-response bias; the propensity model included age, sex, government department, employment category, employment condition, and tenure using the human resources administrative database as the reference population.

In stage 2, models were constructed with the outcome K10 and a dummy variable for ‘survey year’ in the fixed effect section of each model along with covariates for confounders. This process allowed us to determine whether psychological distress scores differed by survey year. We then constructed mixed models by adding the exposure variables and confounders. Models

showing relationships between the exposure and outcome were corroborated by replicating the analysis with the cohort group. Confounders were identified via regression modelling techniques described by Hosmer, Lemeshow and Sturdivant [32] and were defined as those variables that were associated with the outcome and which also produced more than 10% change in an estimated coefficient of the model. Tested covariates included age, marital status (married/living with partner, not married), annual salary, employment category, employment condition, tenure or hours worked. We tested for interaction between survey year and exposure variables in each model to assess whether the effect of exposure differed between surveys. All analyses were conducted using STATA 12.1 (StataCorp LP, Texas, USA).

5.4 Results

5.4.1 Participants

The overall response proportions for the surveys were 28% (n = 3408) in 2010 and 27% in 2013 (n = 3228). The proportions of men and women were also similar across both time points (women: 2010 = 67%; 2013 = 68%). Table 5-1 shows that employees returning surveys had similar characteristics across both time-points.

5.4.2 Availability of workplace health promotion over time

The mean availability of these programs was 14% higher in 2013 than in 2010 for both men and women (Table 5-2), whereas the mean availability of specific mental health programs in 2013 was 10% less for men ($p < 0.024$) and stable for women ($p = 0.604$). Mean availability of lifestyle programs was more than 50% greater for both men and women in 2013. The mean availability of organisational interventions was slightly greater for men ($p = 0.022$) and women ($p < 0.001$) in 2013 than 2010.

Table 5-1. Respondent characteristics for the 2010 and 2013 Healthy@Work surveys.

	Men				Women			
	2010		2013		2010		2013	
	Mean	SD ¹	Mean	SD	Mean	SD	Mean	SD
<i>Continuous Variables</i>								
Age [years, mean] (SE)	47.1	10.1	47.6	10.4	45.8	10.4	46.8	10.3
Tenure (SE)	14.1	11.8	14.9	11.7	12.7	10.2	13.0	10.3
Hours worked (SE)	40.4	12.9	40.1	13.4	36.8	15.7	36.0	15.6
<i>Categorical Variables</i>								
	%	N ²	%	N	%	N	%	N
Marital Status								
Married/ Partner	91	774	94	763	85	1767	85	1711
Not married	9	79	6	52	15	313	15	301
Education								
Post school	61	495	66	514	68	1308	66	1239
Middle school	3	23	2	12	2	40	2	36
Upper school	36	291	32	248	30	567	32	606
Employment Category								
Permanent	88	848	86	785	92	2256	88	2034
Fixed-term/ Casual	12	116	14	131	8	188	12	276
Employment Condition								
Full Time	84	814	84	772	51	1243	48	1105
Part Time	16	150	16	144	49	1201	52	1206
¹ Standard Deviation								
² Number of respondents								

Table 5-2. Ratios of mean availability of and participation in Healthy@Work initiatives in 2013 relative to 2010

	Men						Women					
	Mean		Mean Ratio ¹	95% CI	<i>p</i>		Mean		Mean Ratio	95% CI	<i>p</i>	
	2010	2013					2010	2013				
Availability												
Total	0.41	0.46	1.14	1.10	1.19	<0.001	0.38	0.42	1.14	1.11	1.17	<0.001
Mental Health ²	0.47	0.46	0.90	0.82	0.99	0.024	0.45	0.46	1.02	0.94	1.11	0.604
Lifestyle ³	0.29	0.43	1.55	1.43	1.67	<0.001	0.26	0.37	1.52	1.45	1.60	<0.001
Organisational ⁴	0.41	0.43	1.05	1.01	1.10	0.022	0.38	0.40	1.06	1.03	1.10	<0.001
Participation												
Total	1.97	4.85	1.93	1.71	2.17	<0.001	1.66	3.77	2.16	2.00	2.34	<0.001
Mental Health	0.42	0.59	1.61	1.30	2.00	<0.001	0.29	0.51	1.89	1.61	2.20	<0.001
	1.55	4.27	2.16	1.89	2.47	<0.001	1.37	3.25	2.26	2.07	2.46	<0.001

¹ Ratio of estimated mean exposures to Healthy@Work in 2013 relative to 2010.

² Mental health interventions refer to initiatives directly targeting individual mental health, including stress management programs, employee assistance programs, relaxation etc.

³ Lifestyle interventions refer to interventions targeting individual risk factors known to be associated with poor mental health such as inactivity, nutrition, and high alcohol consumption.

⁴ Organisational strategies are also a form of indirect mental health intervention and refer to a supportive physical environment (e.g. activity space, healthy food options, access to stairs), health promoting policies and individual-organisational initiatives.

Table 5-3. Univariable associations between psychological distress (Kessler-10) and respondent characteristics stratified by sex and survey year.

	Men						Women					
	2013			2010			2013			2010		
	β	95% CI		β	95% CI		β	95% CI		β	95% CI	
Age (continuous)	-0.028	-0.049	-0.008	-0.045	-0.066	-0.023	-0.040	-0.050	-0.020	-0.060	-0.074	-0.047
Marital status												
Married	ref			ref			ref			ref		
Not married	1.039	-0.233	2.311	0.141	-0.719	1.001	0.376	-0.131	0.883	0.110	-0.366	0.585
Education												
Post school	ref			ref			ref			ref		
Middle school	0.325	-2.458	3.107	-0.761	-2.151	0.628	-0.116	-1.199	0.967	0.487	-1.134	2.108
Upper school	0.084	-0.430	0.598	-0.029	-0.533	0.474	0.595	0.197	0.994	-0.007	-0.384	0.370
Employment category												
Permanent	ref			ref			ref			ref		
Fixed term/casual	-0.855	-1.418	-0.292	0.387	-0.393	1.167	0.479	-0.054	1.013	0.172	-0.373	0.717
Employment condition												
Full-time	ref			ref			ref			ref		
Part-time	-0.496	-1.077	0.084	0.093	-0.572	0.758	-0.299	-0.620	0.021	-0.331	-0.627	-0.035
Tenure	-0.018	-0.037	0.001	-0.028	-0.046	-0.010	-0.036	-0.051	-0.021	-0.041	-0.056	-0.027
Hours worked (continuous)	0.009	-0.008	0.025	0.001	-0.017	0.020	0.017	0.006	0.027	0.008	-0.002	0.018

5.4.3 Mean participation over time

Overall, men reported participating in 93% more programs in 2013 than in 2010 while women reported participating in 116% more programs (Table 5-2). The increase in participation was slightly greater in lifestyle compared with mental health programs.

5.4.4 Univariable correlates of psychological distress

Both sexes had covariates univariably associated with age, marital status, annual salary, employment category and employment condition ($p < 0.25$). Hours worked was an additional covariate for women (Table 5-3).

5.4.5 Repeated cross-sectional modelling

Changes in psychological distress over time

Table 5-4 shows that women's K10 scores decreased over time for both the whole group of survey respondents ($p = 0.007$) and for the subgroup who were participants in Healthy@Work programs ($p = 0.009$). No changes in K10 scores over time were observed for men.

Associations between availability and psychological distress

Table 5-4 highlights that there was no relationship between availability of workplace health promotion and psychological distress by sex in either 2010 or 2013. When the components of availability were considered, no associations were found by sex for mental health or lifestyle programs, or organisational interventions.

Associations between participation and psychological distress

Table 5-4 shows a modest positive association over time ($\beta = 0.038$ [95% CI: 0.011 to 0.064]) between the total number of times women participated and psychological distress after adjusting for age. This relationship appeared largely due to participation in lifestyle programs ($\beta = 0.037$ [95% CI: 0.006 to 0.068]) because no clear association was identified for women for mental health programs ($\beta = 0.088$ [95% CI: -0.037 to 0.210]). However we note that the confidence intervals presented for mental health programs were close to

Table 5-4. Linear mixed models regressing psychological distress (Kessler-10) on survey year and on different types of exposure to Healthy@Work.

Kessler-10 All respondents (mean) ^{2a} Participants only ^b Healthy@Work Exposure WHP Availability Total ^a Mental Health ^c Lifestyle ^a Organisational ^a WHP Participation Total ^b Mental Health ^d Lifestyle	Men							Women							Chapter 5
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¹ Kessler 10 coefficient estimated at mean exposure after back-transformation and controlling for confounders.

² Linear mixed model regresses psychological distress on survey year.

³ The probability value compares population means of psychological distress scores over time and is derived from the linear mixed models.

⁴ Beta values represent the results from linear mixed models with no interaction term (i.e. additive models).

⁵ The probability value obtained from linear mixed models where the interaction term '*Exposure x Time*' has been included

^a Adjusted: Men – age (estimated mean) and employment condition; Women – age

^b Adjusted: Men – age and marital status; Women – age

^c Adjusted: Men – age and employment condition; Women – age and marital status

^d Adjusted: Men – age; Women – age and tenure

Table 5-5. Linear mixed models (adjusted) regressing psychological distress (Kessler-10) on survey year and on different types of exposure to Healthy@Work for the cohort of repeat survey responders (n=580).

	Men							Women						
	2010			2013				2010			2013			
	β^1	95%CI		β	95%CI		p^3	β	95%CI		β	95%CI		p
<i>Kessler-10</i>														
All respondents (mean) ^{2a}	12.32	11.77	12.87	12.46	12.03	12.89	0.197	14.12	13.78	14.46	13.91	13.53	14.29	0.036
Participants only ^b	14.34	13.66	15.02	14.31	13.62	14.99	0.848	14.19	13.79	14.59	13.90	13.56	14.23	0.002
<i>Healthy@Work Exposure</i>	β^4	95%CI		β	95%CI		p^4	β	95%CI		β	95%CI		p
WHP Availability														
Total ^a	<-0.001	-0.141	0.140	<-0.001	-0.144	0.143	0.995	-0.027	-0.139	0.086	-0.019	-0.124	0.086	0.250
Mental Health ^c	-0.094	-0.834	0.647	-0.096	-0.850	0.659	0.920	-0.019	-1.250	1.211	0.003	-1.213	1.220	0.072
Lifestyle ^a	-0.132	-0.392	0.128	-0.135	-0.403	0.134	0.775	-0.005	-0.148	0.138	0.002	-0.130	0.134	0.843
Organisational ^a	0.039	-0.176	0.253	0.039	-0.181	0.260	0.834	-0.027	-0.131	0.078	-0.017	-0.117	0.083	0.415
WHP Participation														
Total ^b	-0.020	-0.072	0.032	-0.020	-0.071	0.031	0.229	0.034	0.008	0.060	0.038	0.018	0.059	0.599
Mental Health ^d	0.006	-0.057	0.069	0.006	-0.057	0.069	0.860	0.028	-0.068	0.123	0.032	-0.064	0.128	0.246
Lifestyle	-0.035	-0.137	0.067	-0.034	-0.135	0.066	0.303	0.035	0.002	0.068	0.039	0.013	0.066	0.318

¹ Kessler 10 coefficient estimated at mean exposure after back-transformation and controlling for confounders.

² Linear mixed model regresses psychological distress on survey year.

³ The probability value compares population means of psychological distress scores over time and is derived from the linear mixed models.

⁴ Beta values represent the results from linear mixed models with no interaction term (i.e. additive models).

⁵ The probability value obtained from linear mixed models where the interaction term '*Exposure x Time*' has been included

^a Adjusted: Men – age (estimated mean) and employment condition; Women – age

^b Adjusted: Men – age and marital status; Women – age

^c Adjusted: Men – age and employment condition; Women – age and marital status

^d Adjusted: Men – age; Women – age and tenure

zero. For men, no association was identified between participation and psychological distress ($p=0.378$). No statistical interactions were present between Healthy@Work participation and survey year in any models.

5.4.6 Corroboration analyses

When we replicated the models with the cohort the results across each analysis were consistent with the effects observed for both availability and participation models in the larger respondent population (Table 5-5).

5.5 Discussion

While the total availability of WHP initiatives increased over time, employees reported no increases in availability of programs directly targeting mental health and only modest increases in organisational strategies such as health-promoting amenities or policies. However reported availability of lifestyle-related programs increased by more than 50% for men and women.

Participation by sex in 2013 was approximately double that of 2010 for both lifestyle and mental health programs.

Our results established that psychological distress was lower over time for women but not men. At both time points women with higher K10 scores also tended to participate more. Contrary to the ‘inequality paradox’, which suggests that workers who have better mental health will participate more [33], this finding indicated that the intervention attracted participation from women with poorer mental health. This association appeared due to participation in lifestyle-related (indirect) forms of mental health promotion, such as physical activity and health education. However the small association between women’s participation and psychological distress didn’t fully explain the reduction in K10 scores. Our results were corroborated through sub-analyses using the cohort of repeat responders. This corroboration increased confidence in the findings in the face of arguably low response rates, which were typical of workforce surveys [23]. Recent data from the general working population in the same region showed psychological distress scores were stable for men and women over the same period [34], suggesting that workplace rather than societal factors may have contributed to our results.

It is possible that improvements in mental health for women were associated with reductions in work stressors (organisational change, psychosocial risks) that occurred at the same time Healthy@Work was implemented. These types of organisational interventions were not part of Healthy@Work and so were not quantitatively recorded during our survey processes. It is also possible that women had more opportunities for participation, or were more motivated to participate after 3-years. These are areas needing further investigation. As was noted in the introduction, small effects on mental health from WHP were expected as greater impact will come from a multi-level approach [4]. But any modest improvement can be important given there are many other positive reasons to implement comprehensive WHP [14].

Male participants had higher mean K10 scores than non-participants in both survey years (Table 5-4). However the mental health programs perceived to be available by men decreased over time. We had expected the most obvious pathway for association would be via exposure to programs directly targeting mental health. A number of factors that could have influenced the mental health program results including marketing, content and quality, pre-existing participant mental health [35], or mental health literacy [36]. Future research in naturalistic environments would benefit from closer examination of these factors. However systematic differences have also been found for men and women in the way they perceive work and report on work [37]. For men, who were higher wage-earners and more likely to be in full-time or management positions in this organisation, perceived or real exposure to threats of job-loss and work intensification [38] may have contributed to results. Selected or indicated interventions [39], employing effective mental health programs may have been more appropriate for men in this environment.

Healthy@Work was very successful in attracting participation from employees. Data from other universal studies shows that quality mental health programs delivered through WHP can improve employee mental health [7]. Further, as mental illness is frequently a covert disorder, the observed increases in participation in mental health programs are a good sign and may reflect decreased stigma [40 41]. Clearly further inquiry is needed to determine why these direct programs in this study did not translate to a change in population

mental health. For studies of whole working populations, it may be that an integrated approach to mental health surveillance that includes health protection, promotion and job-specific interventions is needed to better understand the underlying dynamics between these intervention areas.

5.5.1 Limitations

The repeated cross-sectional and cohort subgroup analyses produced consistent findings, however neither approach allows causal inference. Analyses were weighted for non-response and adjusted for a range of potential confounders and as such we can be reasonably confident of their generalizability to the working population under study. However we did not have a control group. It is possible that factors that could have influenced employee mental health that were not measured, including the changing nature of work and organisational context. Factors such as the presence of remote worksites or high workforce proportions of part-time or shift-work, may have had different types of effects on how WHP was experienced [42]. It is also possible that people with poor mental health were less likely to complete surveys [43].

We note that our self-reported measures of availability and participation were susceptible to recall bias [44] and may have been too crude. We do not know whether the changes in wording of the response period for our exposures affected the results. However, participant-reported increases in WHP availability paralleled audit data obtained from Tasmanian Government. The time period between survey measures may have been too long to capture more immediate exposure effects, or too short to identify longer term population-based changes. Measurement of WHP programs and organisational interventions at a work unit level [45] may also have provided further clues about how factors such as manager support and operational priorities influenced individual reports of WHP availability and participation.

5.6 Conclusions

Healthy@Work was successful in attracting participation from men with higher average psychological distress and increasing participation among women with poorer mental health scores. These contributions were important but they did

not translate to a change in men's mental health and only made a partial contribution to the observed reduction in women's psychological distress over time. Nevertheless, scope remains for remains for comprehensive WHP to prove its worth as a universal intervention for mental health because direct interventions have evidence of success [7], and because they provide a pathway that raises the profile of mental health, thereby reducing its stigma [46]. When conducting naturalistic studies on mental health in work environments, a more integrated approach to employee health surveillance may be needed, which encompasses worker health promotion, protection and job-specific interventions.

5.7 Postscript

Chapter 5 showed that Healthy@Work was successful in attracting employees, including those in the right target groups to its programs, so the onus for mental health change then relied on program effectiveness. Mental health gains were not observed after 3 years through participation in lifestyle-related programs alone. Therefore, the quality of universal mental health programs, and their application in conjunction with selected or indicated interventions in the workplace seem paramount considerations for at-scale intervention.

The next chapter continues the examination of time-based differences in mental health by assessing whether WHP-related activities ameliorate the job stressor-strain relationship.

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Chapter 6. Does workplace health promotion contribute to whole-of-workforce job stress reduction?

Jarman L, Venn A, Martin, A., Otahal P, and Sanderson K. Does workplace health promotion contribute to job stress reduction? Submitted to BMC Public Health on 8 September 2015. Currently under review.

6.1 Preface

Chapter 3 highlighted that job stress, as measured by effort-reward imbalance (ERI) was a key contributor to high psychological distress in the Tasmanian Government workforce. This chapter first discusses the conceptual overlaps between WHP and job stress frameworks and then longitudinally assesses whether working population job stress changed over time in association with Healthy@Work.

6.2 Introduction

Job stress can lead to absenteeism (1) and presenteeism (2), and has been estimated to contribute to 40% of all job turnover (3). Evidence favours causal links between job stress and increased risk of down-stream illness (4-7). The World Health Organisation (WHO) cites workplace health promotion (WHP) as beneficial to job stress prevention, stating that health-promoting workplaces should address health at a systemic- (policies, practices, systems) as well as individual-level (8). However, findings in favour of effective systems-level intervention to prevent job stress remain inconclusive. Evidence for stress prevention largely stems from individual-level stress management interventions (9-12).

Comprehensive WHP, a term given to interventions targeting both individual- and system-levels (13), has proven popular among employers, with associated decreases in absenteeism, presenteeism (14) and financial returns on

investment (15,16). Nevertheless, publications citing research on comprehensive forms of WHP with job stress outcomes are uncommon (17) with the majority focusing on employee participation (18).

Conceptually, WHP appears associated with job stress in two key ways. First, investment in the ‘social capital’ of the organisation (19-21) may contribute to workers’ perceptions of support (19) from their organisation because the employer shows care for their health and well-being (22,23). The presence of WHP may also serve to reduce the stigma associated with reporting health-related issues or to enhance general health awareness among employees (23). These emotional and cognitive effects have been linked to improved job satisfaction (18,24) and mental health (25). However, we were unable to identify any published articles that separated WHP availability from WHP participation when assessing whole-of-workforce job stress.

Second, exposure to job stress can provoke short-term behavioural responses such as inappropriate nutrition (26), smoking (27), physical inactivity (28) and alcohol consumption (29). Extended exposure to situations stimulating stress responses can also lead to chronic arousal or strain (30). Participation in workplace activities targeting known health risks or enhancing work-related coping strategies aims to reduce job stress. Meta-analytic research supports this link between participation in WHP programs, reduced job stress and improved mental health (9,10,18,31). Comprehensive strategies have also been shown to be more effective than approaches tackling only organisational or individual-level factors (32). However, gaps remain in understanding time-related effects (17) and intervention effectiveness when WHP is scaled-up in size to intervene with whole working populations (33).

Effort-reward imbalance (ERI) concepts appear suited to assessing both pathways and a strong evidence-base is available across a broad range of occupations supporting the association between self-reported measures of ERI and enduring health outcomes such as cardiovascular disease (34,35) and diabetes (36). Effort-reward imbalance theory asserts that work is a form of mutual exchange, or reciprocity, where job-related efforts are traded for rewards (i.e. job security, career advancement, self-esteem) as a type of ‘social contract’. The theory proposes that insufficient reward for work effort can

negatively impact upon the capacity of an individual to regulate their emotions, thoughts and behaviours, which in turn can lead to job strain (37). Workplace health promotion may be viewed as an organisational benefit signalling regard for an employee's welfare, thereby increasing perceived organisational support and enhancing self-esteem (19). Research has highlighted that ERI measures explain unique variance in relation to the macro- or contractual factors contributing to mental health outcomes, and that the effort dimension can be likened to job-related demands (38,39).

This project evolved from a collaboration between university researchers and government (public sector) that had the goal of evaluating the long-term effectiveness of a comprehensive multi-component WHP initiative, named Healthy@Work. Baseline workforce survey data had indicated that ERI was a key correlate of high psychological distress among employees, and that mental health varied by sex when compared with working population norms (40). We hypothesized that i) higher availability of WHP would be positively associated with perceived reward, particularly through improved self-esteem (given job security and career progression were unlikely to be impacted by WHP), and ii) higher participation in WHP would be negatively associated with perceived effort.

6.3 Method

6.3.1 Setting and study population

Tasmania is an Australian region with a population of around half a million people. The Tasmanian Government employed approximately 28,000 public sector workers across 14 separate organizations (government departments), which are highly diverse in their functions (e.g. health, education, fire services), locations (e.g. urban, rural, remote) and occupations. Participants were drawn from this working population.

6.3.2 Intervention

Overview

Between 2009 and 2012, the Tasmanian Government invested approximately \$2 million in a whole-of-workforce WHP intervention called Healthy@Work. A small, centralised Healthy@Work team was responsible for the associated structural changes including strategy, model development, principles and implementation cycle, and was tasked with oversight of this new government policy focus on WHP. Implementation was mandatory and was delegated to the senior executive of each government department. It was internally audited each year until its conclusion in mid-2012. Our research team commenced a partnership with the Tasmanian Government in 2010 to conduct a naturalistic evaluation of the intervention.

Department-based activities

Departments were responsible for establishing in-house WHP vision, strategies and action plans, and for reporting on progress. Grant funding was available to departments as an incentive for WHP including for example, development of a workplace health promotion resource toolkit, funding equipment or recreation spaces, development of a computer-based system to interrupt sitting time and prompt healthy activity, and individual assessment, activity or education programs. The number of departments with an established WHP program increased from 6 in 2009 to 13 in 2011.

Exposures

Healthy@Work strategies targeted i) individuals via mental health and well-being, health education, health assessments, physical activity, and injury management, and ii) organizational change through initiatives such as increasing physical space for health-activities, making healthy food options available, funding onsite gymnasiums, giving access to stairs, promoting health via information bulletins and implementing health-promoting policies. Primary job stress prevention strategies (e.g. job control) were not included in Healthy@Work.

For analysis of individual exposures we first calculated a score indicating the ‘availability’ of Healthy@Work strategies (41). This score was obtained from questions asking respondents to provide a ‘yes’ or ‘no’ answer to a specified list of Healthy@Work amenities and programs (Appendix A). The availability timeframe was ‘the previous 12 months’ in 2010 as a baseline reference period and ‘the previous 3 years’ in 2013 to capture the period over which Healthy@Work was implemented. A ‘total availability’ score was derived from per-person counts of positive responses to question items. Where participants provided a ‘yes’ answer to activities, they were asked for the number of times they had participated and we used this information to calculate ‘participation’ scores.

6.3.3 Outcomes

Our overall measure of job stress outcome was Effort-reward imbalance (ERI). We applied the 17 item ERI questionnaire, which is a validated self-report survey with 6 items measuring Effort and 11 items dedicated to Reward (42). A ratio is typically calculated for every person by first adding all scores for each of the effort (e) and reward (r) scales, then applying the formula $e/(r \times c)$ where c equals the proportion 6/11. Scores ≥ 1 are argued to indicate job strain conditions. The procedure for calculating the Reward component and its subscales of self-esteem, job security and career advancement has been described elsewhere (42). Continuous scale scores were used to maximize the data available for analysis.

6.3.4 Participants and sample size

We collected data via repeated, cross-sectional postal survey (2010 and 2013), selecting a 40% random population sample from the total pool of workers, stratified according to employment condition, employment category and department. In 2013 a portion of workers were re-selected by chance and survey respondents from this group were referred to as the ‘cohort’ (men = 161; women = 423). Survey responses were merged with de-identified administrative data and this process enabled propensity weighting to adjust for possible non-response bias (described below).

6.4 Statistical analysis and methods

The repeated cross-sectional surveys were analysed together in two-stages: 1) assessing whether mean ERI or its subcomponent scores changed over time and estimating associations between these scores and the availability of, or participation in Healthy@Work programs in 2010 and 2013; and 2) assessing whether there were changes in availability or participation over time. Survey responses were anticipated to be more similar within government departments, and for those who were in the cohort of repeat respondents. Mixed-effects linear regression modelling with random intercepts for department and participants was used to allow for correlated responses. Models were stratified by sex due to known differences in employee reporting of psychological distress. In stage 1, linear mixed-models were constructed with the outcome ERI (or its subcomponents) and a dummy variable for ‘survey year’ in the fixed effect section of each model along with covariates for confounders (43). This process allowed us to determine whether ERI scores or their components changed by survey year. We then added covariates for total availability or participation. We tested for interaction between survey year and Healthy@Work exposure variables in each model to assess whether the effect of exposure changed between surveys. Confounders were identified via regression modelling techniques described by Hosmer, Lemeshow and Sturdivant (44) and were defined as those variables that were associated with the outcome and which also produced more than 10% change in an estimated coefficient of the model.

Poisson regression with random effects as above was used to assess whether mean availability of, or participation in Healthy@Work strategies had changed over time. Model diagnostics from linear mixed effects models showed that residuals were skewed and an inverse transformation was applied to the ERI values. We then back-transformed the ERI results to present mean estimates on the original scale of measurement. Further we applied propensity weighting as described by Little and Rubin (45) to deal with potential non-response bias; the propensity model included age, sex, government department, employment category, employment condition, and tenure using the human resources administrative database as the reference population.

Models showing relationships between the exposure and outcome were corroborated by replicating the analysis with the repeat-respondent cohort. All analyses were conducted using STATA 12.1 (StataCorp LP, Texas, USA).

6.5 Results

6.5.1 Participants

Survey response proportions were 28% (n= 3406) in 2010 and 27% (n = 3228) in 2013. When compared with non-responders, responders tended to be older, have longer average tenure, and for women, be permanent employees (Table E-3). Weighting addressed these response variations. Table 6-1 shows basic respondent characteristics across both time-points. Men were proportionally more likely to be full-time employed (84% in 2013) than women (48% in 2013).

6.5.2 Availability of, and participation in Healthy@Work programs

Estimated percentages of workers reporting availability of different types of Healthy@Work initiatives in 2010 and 2013 were illustrated in Figure 5-1. Poisson modelling (see Table 5-2) showed that WHP availability was 14% higher (for men and women) in 2013 (95% CI: 12% to 17%). The number of times men and women participated across all programs had approximately doubled in 2013.

6.5.3 Univariable correlates of job stress

Covariates univariably associated with ERI were age, marital status, annual salary, education, employment band, employment category, employment condition, tenure, hours worked and regular work-days (Table 6-1). In subsequent model testing, age was a confounder for availability and age and employment band were confounders for participation among men. All models were adjusted accordingly.

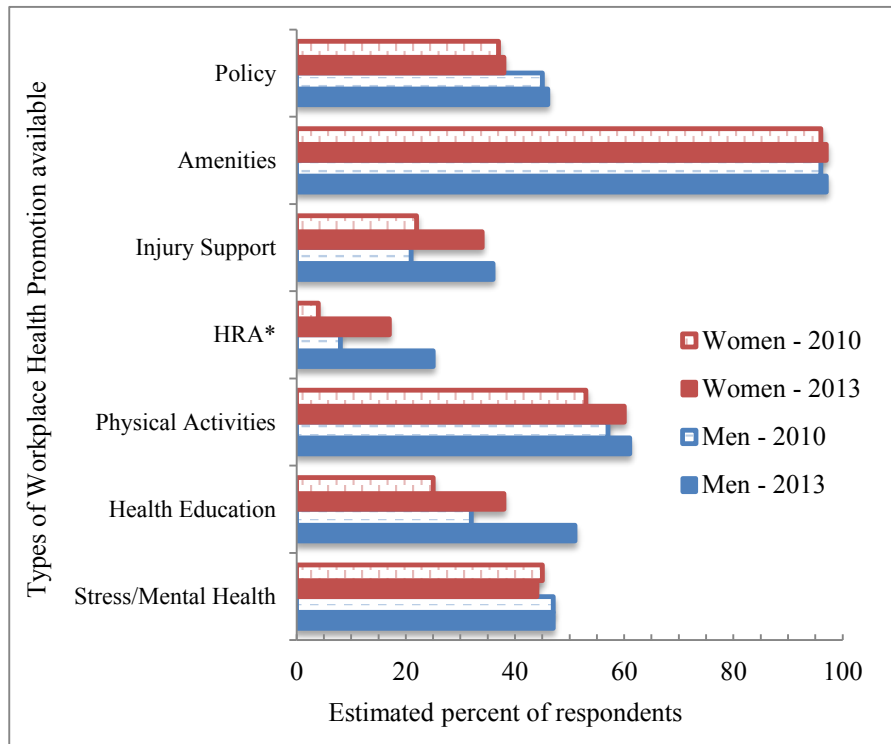


Figure 6-1. The range of available Healthy@Work initiatives in 2010 and 2013 reported by respondents in 2010 and 2013.

*= Health Risk Assessments

Table 6-1. Univariable associations between job stress (Effort-Reward Imbalance) and respondent characteristics stratified by sex and survey year.

	Men						Women					
	2013			2010			2013			2010		
	β	95% CI		β	95% CI		β	95% CI		β	95% CI	
<i>Effort-Reward Imbalance</i>												
Age (continuous)	0.001	-0.001	0.001	-0.001	-0.002	0.000	0.000	-0.001	0.001	0.001	0.000	0.001
Marital status												
Married/Partner	ref			ref			ref			ref		
Not married	0.013	-0.047	0.072	-0.026	-0.051	-0.001	0.012	-0.007	0.032	0.013	-0.007	0.033
Annual salary	0.011	-0.003	0.003	0.002	-0.005	0.010	0.010	0.002	0.019	0.011	0.000	0.022
Education												
Post school	ref			ref			ref			ref		
School	-0.023	-0.020	0.032	-0.020	-0.040	0.000	-0.030	-0.046	-0.014	-0.023	-0.038	-0.008
Band												
Low/mid	ref			ref			ref			ref		
High/very high	0.039	-0.023	0.024	0.024	0.003	0.044	0.020	-0.003	0.043	0.039	0.019	0.059
Employment category												
Permanent	ref			ref			ref			ref		
Fixed term/casual	-0.026	-0.089	-0.033	-0.028	-0.056	-0.001	-0.034	-0.053	-0.015	-0.026	-0.048	-0.003
Employment condition												
Full-time	ref			ref			ref			ref		
Part-time	-0.029	-0.058	-0.006	-0.030	-0.055	-0.005	-0.035	-0.048	-0.022	-0.029	-0.041	-0.017
Tenure	0.002	-0.001	0.001	0.001	0.000	0.002	0.001	0.001	0.002	0.002	0.002	0.003
Regular day worked												
Yes	ref			ref			ref			ref		
No	-0.032	-0.058	-0.006	-0.028	-0.049	-0.008	-0.040	-0.058	-0.022	-0.032	-0.048	-0.017
Hours worked (continuous)	0.002	0.001	0.003	0.003	0.002	0.003	0.002	0.002	0.002	0.002	0.001	0.002

Table 6-2 Linear mixed models for all respondents regressing Effort Reward Imbalance (ERI) and its scales on exposure availability of Workplace Health Promotion (WHP#).

Outcome measure	Men							Women						
	2010				2013			2010				2013		
	β ¹		95%CI	β		95%CI	p ²	β ¹		95%CI	β		95%CI	p
ERI (mean)	0.371	0.351	0.391	0.410	0.384	0.435	<0.001	0.373	0.357	0.389	0.366	0.344	0.387	0.414
Reward	47.88	45.63	50.13	44.97	42.28	47.67	<0.001	47.41	46.71	48.10	47.73	47.19	48.26	0.267
Self-esteem	21.95	21.26	22.64	21.10	20.29	21.90	0.002	21.65	21.20	22.10	21.65	21.32	21.98	0.897
Job security	8.77	7.84	9.70	7.12	6.09	8.14	<0.001	8.39	8.22	8.55	8.26	7.88	8.63	0.488
Career promotion	16.32	14.96	17.69	15.10	13.66	16.54	<0.001	16.36	15.96	16.76	16.68	16.34	17.01	0.010
Effort	10.13	9.69	10.56	10.80	10.40	11.21	<0.001	9.99	9.60	10.38	9.85	9.31	10.38	0.494
Exposure	β ³		95%CI	β		95%CI	p	β ³		95%CI	β		95%CI	p
WHP Availability ^a														
Reward	0.332	-0.185	0.848	0.295	-0.156	0.746	0.218	0.161	0.029	0.293	0.154	0.020	0.288	0.020
Self-esteem	0.040	-0.317	0.397	0.037	-0.295	0.369	0.827	0.135	0.062	0.207	0.128	0.050	0.206	<0.001
Job security	0.059	-0.018	0.136	0.148	0.012	0.283	0.043 ⁱ	-0.042	-0.096	0.012	-0.035	-0.090	0.019	0.135
Career promotion	0.088	-0.034	0.211	0.076	-0.026	0.178	0.167	0.027	-0.080	0.134	0.026	-0.087	0.139	0.627
WHP Participation ^b														
Effort	-0.025	-0.043	-0.007	-0.025	-0.042	-0.007	0.009	0.011	-0.015	0.036	0.011	-0.013	0.034	0.420

¹ Estimated scale score excluding exposure after back-transformation and controlling for confounders.

² p-value of linear mixed models regressing the outcome measure on survey year. Models were adjusted for age.

³ Values represent the results from linear mixed models including exposure variable. Beta values have been back-transformed to estimate the coefficient on the original scale.

^a Adjusted for age (estimated mean); ^b Adjusted: Men – age and employment band; Women – age.

ⁱ Represents interaction term present in model.

[#] The results are based on a composite measure that includes all forms of workplace health promotion (i.e. policy, amenities, injury support, health risk assessment, physical activities, health education, stress/mental health).

Table 6-3 Linear mixed models for the cohort group regressing Effort Reward Imbalance (ERI) and its scales on exposure availability of Workplace Health Promotion (WHP#).

Outcome measure	Men							Women						
	2010			2013			p^2	2010			2013			p^2
	β^1	95%CI		β	95%CI			β	95%CI		β	95%CI		
ERI (mean)	0.379	0.353	0.404	0.422	0.389	0.457	<0.001	0.376	0.342	0.411	0.369	0.330	0.408	0.496
Reward	49.47	47.98	50.96	46.42	44.25	48.58	0.012	45.62	40.27	50.96	45.93	40.61	51.26	0.237
Self-esteem	22.54	21.98	23.07	21.73	20.99	22.48	0.010	20.78	17.90	23.67	20.80	18.06	23.53	0.961
Job security	9.26	8.05	10.48	7.12	6.16	8.07	<0.001	7.67	6.21	9.13	7.61	5.98	9.24	0.851
Career promotion	17.50	16.69	18.31	16.26	15.15	17.37	0.004	16.47	15.34	17.39	16.81	15.95	17.68	0.012
Effort	10.42	9.74	11.11	11.18	10.47	11.90	0.020	10.23	9.46	11.00	10.09	9.21	10.96	0.577
Exposure	β^3	95%CI		β	95%CI		p^4	β	95%CI		β	95%CI		p^4
<i>WHP Availability^a</i>														
ERI	-0.006	-0.012	-0.001	-0.008	-0.014	-0.001	0.012	0.001	-0.001	0.003	-0.004	-0.007	-0.001	0.002 ⁱ
Reward	0.338	-0.235	0.911	0.301	-0.201	0.802	0.251	0.124	0.006	0.242	0.118	0.004	0.239	0.072
Self-esteem	0.041	-0.339	0.421	0.038	-0.318	0.395	0.833	0.102	0.024	0.180	0.128	0.050	0.206	0.022
Job security	0.055	-0.042	0.151	0.131	-0.006	0.278	0.091 ⁱ	-0.044	-0.092	0.006	-0.033	-0.081	0.014	0.065
Career promotion	0.104	-0.043	0.252	0.091	-0.033	0.215	0.173	0.023	-0.086	0.132	0.024	-0.092	0.140	0.684
<i>WHP Participation^b</i>														
Effort	-0.040	-0.076	-0.004	-0.039	-0.074	-0.004	0.029	0.014	-0.016	0.043	0.015	-0.016	0.046	0.117

¹ Estimated scale score excluding exposure after back-transformation and controlling for confounders.

² p-value of linear mixed models regressing the outcome measure on survey year. Models were adjusted for age.

³ Values represent the results from linear mixed models including exposure variable. Beta values have been back-transformed to estimate the coefficient on the original scale.

^a Adjusted for age (estimated mean); ^b Adjusted: Men – age and employment band; Women – age

ⁱ Represents interaction term present in model.

[#] The results are based on a composite measure that includes all forms of workplace health promotion (i.e. policy, amenities, injury support, health risk assessment, physical activities, health education, stress/mental health).

6.5.4 Repeated cross-sectional modelling

Changes in Effort Reward Imbalance over time

Table 6-2 shows that men's ERI score estimates excluding exposure to WHP were approximately 4 points higher over time ($p < 0.001$), with corresponding increases in perceived effort and decreases in perceived reward, including its subcomponents of self-esteem, job security and career promotion. These results indicate there were basic increases in ERI scores for men in 2013 (i.e. time-based differences) that were not accounted for by the socio-demographic factors or work characteristics measured here. Women's results indicate mean ERI scores were less over time, but were not statistically different between 2010 and 2013 ($p = 0.414$).

Changes in perceived effort and reward in association with WHP

At baseline, Table 6-2 also shows an inverse and additive relationship was identified between higher participation in WHP and lower effort scores for men [$\beta = -0.025$, 95%CI: -0.043 to -0.007]. Over time the magnitude of effect for this association increased ($p = 0.009$) but estimated beta-values were modest overall. Statistical associations between WHP availability and reward (and its subcomponent self-esteem) were neither present at baseline nor over time for men ($p = 0.218$). Similar results were also found for the reward sub-component, self-esteem ($p = 0.827$) for this group.

For women, no statistical relationship was identified between WHP participation and effort at either time point ($p = 0.420$). However an additive association was found at baseline between higher WHP availability and higher perceived reward [$\beta = 0.161$, 95%CI: 0.029 to 0.293] that included higher self-esteem for this group. Over time the magnitudes of effect for these associations both increased (reward: $p = 0.020$; self-esteem: $p < 0.001$) among women but did not translate to a statistical difference in either reward or self-esteem in 2013.

6.5.5 Cohort analyses

To corroborate the effects observed in repeated cross-sectional analyses we replicated our models using confirmatory evidence from the cohort of repeat

responders (Table 6-3). The model results show a high degree of overlap for coefficient estimates of the cohort and general respondent populations.

6.6 Discussion

Our first hypothesis, that higher availability of WHP would be positively associated with perceived reward through improved self-esteem was supported among women but not men. Our second hypothesis, that higher participation in WHP would be negatively associated with perceived effort was supported for men but not women. However, the magnitudes of effect for these additive associations were modest and were not reflected as statistical differences in perceived effort or reward (including self-esteem) at a working-population level over time. We found a high corroboration between results for the repeat-responder cohort and the broader respondent group, which was randomly sampled and weighted to minimize non-response bias. Therefore these results seem generalizable to the source population of public sector workers under study.

To show effects at a population level, additive relationships rely on increased dosage of exposure (e.g. higher volumes of availability or higher participation levels). In 2013 self-reported WHP availability increased by 14% and participation approximately doubled over time. Systematic differences in occupational exposures between sexes, linked to disparities in perceptions and/or reporting and variations in exposure between or within jobs (46) may also have contributed to our results.

For women, we infer WHP availability contributed to perceptions of organisational support thereby enhancing self-esteem (20). The ERI self-esteem construct was derived from items capturing perceptions of i) respect from supervisors and colleagues, ii) adequacy of support in difficult situations, and iii) effects of job interruptions (42). Research using this concept of social exchange for other forms of non-monetary employee benefits, such as manager trustworthiness and procedural justice has supported their relationship with job satisfaction and employee turnover (47). However, the increases in WHP availability may have been of insufficient dose, or may have needed supplement from other non-monetary benefits to show changes in self-esteem

at a population-level. It is plausible that participation effects were not detected for women because perceived job effort was relatively low at baseline (48).

The time period for Healthy@Work implementation coincided with the global economic downturn, which had major financial ramifications for the Tasmanian Government. During the implementation period, government directives also focused on long-term reduction of operating costs, including labor costs via vacancy control and productivity management. For men, who were higher wage-earners and more likely to be working in full-time or management positions, it is possible that the adverse events reported here may have contributed to perceived or real threats of job-loss and work intensification (49). Higher WHP participation may have enhanced work-related coping or personal well-being but it was only one side of the effort-reward equation. We interpret that men did not perceive WHP availability as a reward. It is possible that men in this workforce were more sensitive to job security than socio-emotional relationship issues (50). Therefore attention to areas such as self-esteem, job security and promotion prospects through stress management programs or primary stress prevention interventions may have been more suited to addressing increased job stress among men.

6.6.1 Limitations

Repeated-cross sectional designs offer advantages in cost and allow for changes in working population characteristics but they do not allow causal inferences. Neither do they control for baseline differences in exposure to interventions or between individuals, or influences on results due to inter-departmental migration, (51,52). Other research has shown that for large population samples repeated cross-sectional designs can be superior to cohort designs (52). Linear mixed-modelling analysis also provides robust estimates in the face of modest associations (53). Further, even though response rates were arguably low, they were typical for organizational surveys (54) and have been addressed here through weighting procedures. We acknowledge we did not have a control group and that it is possible that people with greater stress may have chosen not to respond to the surveys (55,56). Our study did not measure societal trends and commonly changing features of public sector

workforces may have influenced the observed changes in effort and reward over time. Furthermore, our self-reported measures of exposure may have been too crude. We do not know whether the changes in wording of the response period for our exposures affected the results. However, the self-reported increases in WHP availability appeared to mirror data obtained from the employers' audit processes (Figure E-1). More detail on specific types of interventions from organizations would have been an advantage. Identification of further exposure effects may require differently timed data collection. Recall bias can also be an issue in self-reported data (57).

6.7 Conclusions

This research provides much-needed evidence of potential benefits obtained from a comprehensive WHP intervention in a naturalistic setting. Interesting gender differences were observed with WHP availability associated with a sense of reward via enhanced self-esteem among women, and WHP participation associated with lower perceived effort in men. Gains associated with comprehensive WHP were modest over time and men in particular may have benefitted from more traditional preventative stress management interventions. These findings appeared generalizable to the general population of public sector workers.

6.8 Postscript

This chapter showed that availability of WHP was associated with lower job stress for women over time but its modifying effects were small. Contrary to the findings in Chapter 5, participation in WHP had no association with job stress for either men or women, and the sex-based differences identified in these two studies are discussed in the next chapter.

Chapter 7 brings the findings of the thesis together by recapping key results, synthesizing the evidence, and recommending areas for future research.

6.9 References

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Chapter 7. Discussion and Conclusions

This thesis aimed to examine the promotion of mental health in a large and diverse public sector workforce by

- i) Determining the prevalence and correlates of employee psychological distress [Chapter 3].
- ii) Establishing workforce trends, costs and correlates of stress-related workers' compensation claims in this workforce [Chapter 4].
- iii) Assessing which parts of a comprehensive workplace health promotion initiative may benefit mental health [Chapter 5].
- iv) Identifying the associations between comprehensive workplace health promotion and one of the major pathways to mental ill-health, job stress [Chapter 6].

7.1 Key findings and unique contribution to the literature

7.1.1 Prevalence and correlates of high psychological distress in a large and diverse public sector workforce: Baseline results from Healthy@Work

The study reported in Chapter 3 was the first, to our knowledge, to use the Kessler-10 (K10) questionnaire within a workplace to compare the prevalence of high psychological distress using two different surveying methods. Further, it benchmarked distress prevalence against representative samples drawn from regional and national working populations. The findings highlighted that men and younger employees in the Tasmanian Government workforce reported higher levels of distress than workers in the general population. It also revealed that these self-reported results were found in both the anonymous, online Healthy@Work survey and the more comprehensive Partnering Healthy@Work postal survey. This benchmarking highlighted that the online survey consistently presented higher ratings of distress across age and sex categories. However it is possible that a selection effect may be occurring for men and younger employees in this public sector workforce. For instance, as a service-focused industry also

experiencing work intensification, men working in government jobs may be more likely to report psychological distress {Grandey, 2000 #686} {Landisbergis, 2014 #2917}. Job stress, as measured by high effort-reward imbalance (ERI) was a key correlate of high psychological distress for both men and women, and non-permanent work was also a risk factor for men. These findings led us to query the sorts of issues contributing to job stress within this workforce, and highlighted the importance of examining whether WHP was related to differences in job stress in Chapter 6.

The finding that anonymous online screening appeared to overestimate the prevalence of high psychological distress is significant because it reinforces the importance of the survey method used for routine forms of workforce surveillance. Broader comparisons between the surveys were not possible because the Healthy@Work survey only captured socio-demographic data on age and sex. Although this approach promoted confidentiality, it neither enhanced the survey's response rates when compared to the Partnership survey, nor enabled a deeper level of description or analysis. For example, the routine survey results may well have reflected data collection for an important segment of the working population (e.g. those reporting high distress may have represented a greater proportion of online respondents). Had additional information been available it may have given further clues for the inflations in prevalence of high distress observed for the Healthy@Work survey.

The finding that job stress was a key correlate of mental ill-health was also important because it highlighted that more factors were at play than the range of expected socio-demographic, health and contractual work variables. In our adjusted classification models in Chapter 3 job stress remained independently correlated with our mental health outcome. This result suggested that important personal, work organisation or psychosocial factors contributing to job stress were not measured. It suggested that inclusion of broader measures, or supplementary forms of measurement may have given greater explanation for job stress. Reporting bias can also inflate associations between similar measures, such as job stress and mental health. Measurement of mental health at a work unit level may have given a more conservative estimate than our results

(1). These considerations would have helped the translation of survey findings into targeted workplace or policy responses aimed at reducing risk of poor mental health.

There were two key reasons for our scale selections. First, Healthy@Work was not conceived as a stress management intervention. At commencement a focus on job stress factors was not justifiable within this universal intervention. The K10 was the only health-related measure that showed a risk greater than population norms in the 2010 Partnering Healthy@Work survey and its correlates therefore deserved further investigation. However this result could not have been predicted in advance. Second, although a range of best-practice job-stress surveys (e.g. demand-control, organisational change, climate measures) were reviewed for inclusion prior to both surveys the number of scales and questions needed to capture job-related stressors was prohibitive in the face of an already-lengthy form. These issues were realistic concerns and have important implications (discussed later) for health research in workplaces.

7.1.2 Trends, costs and correlates of stress-related workers' compensation claims in a public sector workforce

Countries around the world have attempted to reduce job stress injuries and illnesses by reforming work, health and safety (WHS) legislation to prevent psychosocial risks and enhance return to work. Despite the need to know whether these reforms are making a difference, the study presented in Chapter 4 was the first publication to model stress claim trends and costs within a large and diverse public sector workforce. It was also the first to assess the usefulness of regulatory data in classifying features associated with stress claims. However, it is important to acknowledge that cross-country, and regional comparisons for occupational illnesses and injuries are often challenging due to differences in legislation (2). Nevertheless, our findings that stress claims in the public sector workforce were i) low in volume in but high in cost (3,4), and ii) mostly classified (>60%) as attributable to 'work pressure', were consistent with other international and national research on workplace mental injuries and illnesses (5).

The result that older workers were more likely to submit stress claims was consistent with other trended Australian data (6) but contrary to international research, which now shows the average age for workers applying for work disability benefits due to poor mental health has decreased over time (7). The proportions of men reporting occupational mental diseases in this public sector workforce were greater than those for women. This result could indicate downstream effects of the high psychological distress identified for men in Chapter 3. The finding, of no difference in numbers of new stress claims over the 4-year time period, was unexpected when compared with Australian data, which had highlighted rising trends for occupational mental diseases. However, non-stress claims did increase for men over 45 years and women over 55 years for the period examined. The stability in cost and rate trends also suggested that stress claims were unlikely have led to the rises in compensation premiums observed for the Tasmanian Government (8). It was difficult to be conclusive about the direction of these trends in view of the relatively short time period examined. Given that older workers in the Tasmanian Government workforce were more likely to submit compensation claims, these results suggest this workforce would benefit from strategies targeting the physical and mental health of older workers. Recently released research has suggested that older employees are more likely to stay working longer if they had more control over work time (9), good mental health and higher levels of trust in their supervisors and peers (10).

This study did not examine factors contributing to the increase in physical claims for illness and injury for men over 45 years and women over 55 years. In view of the results in Chapter 3, which showed that men were more at risk of high distress, it seems important to determine whether these claim increases were associated with psychosocial hazards but reported as physical health outcomes (e.g. musculoskeletal disorders) (11,12). As was noted in the introduction, Tasmania is a socio-economically disadvantaged region that has limited work options. For men experiencing mental ill-health in this public sector organisation, it may be more socially acceptable to attribute work stress to physical causes than to risk stigmatization that may limit work options (13,14). In addition, comparisons with age-based national regulatory data using similar

modelling techniques to those applied here would be useful to assess whether the Chapter 4 results could be generalized more broadly across Australian public sector workforces.

However, the most valuable contribution of Chapter 4 has been the identification of systemic problems within Australian regulatory structures supporting workers compensation for job stress. These systems are intended to enhance prevention of job stress. As such they are critical to policy development on occupational mental diseases and work-related disability. Chapter 4 shows these systems are out of date with modern job stress research. This has meant that illness and injury data on national mental diseases as well as those in Tasmania are likely to i) misrepresent the incidence of stress claims; ii) exclude situations that may lead to occupationally-derived mental disease; and iii) inadequately describe the contributors of occupational mental disease. Further, the commentary appendicised to Chapter 4 revealed that the new Australian WHS legislation mandates employer responsibility for psychosocial as well as physical workplace risks.

7.1.3 Workplace health promotion and mental health?

Chapter 5 described a unique study that tracked differences over time in employee mental health that occurred in association with the Healthy@Work intervention, which targeted a 28,000-strong workforce. This study is important because of its rare ‘at scale’ methodology (15) and its novel focus on whether certain components of this universal intervention were related to differences in mental health over time. The results from the study were corroborated by data from a substantial cohort of repeat responders. Repeated cross-sectional analysis is comparatively rare in workforce research and our analysis has contributed a replicable method for other workforce studies of this sort.

As hypothesized, the results identified that psychological distress was associated with higher levels of general participation in WHP. Contrary to the ‘inequality paradox’, which suggests that workers who have better mental health will participate more (16,17), women with higher distress scores also had higher levels of participation. This finding indicated that the intervention attracted

participation from women who were more vulnerable to mental ill-health. However, this association appeared due to their participation in lifestyle-related (indirect) forms of mental health promotion, such as physical activity and health education. Direct participation in mental health programs [e.g. cognitive behaviour therapy, mental health literacy (18)] was expected to be more likely to have a relationship with psychological distress but this was neither the case for men nor women despite evident increases in participation over time. Chapter 5 describes a range of factors (e.g. program quality, measurement, exposure) that may have contributed to this outcome.

Given the modest effect sizes of the association between psychological distress and WHP participation for women, and its apparent reliance upon indirect forms of mental health intervention, it seems unsurprising that it did not meaningfully contribute to the observed lowering of women's psychological distress scores over time. Chapter 5 posits that this time-based difference may have been due to increased opportunities for participation for women, or better work conditions in government departments adopting comprehensive WHP.

Overall, these results suggest scope remains for comprehensive WHP as a universal intervention for mental health because direct interventions have evidence of success (19), and because they provide a pathway that raises the profile of mental health, thereby reducing its stigma (20).

7.1.4 Does workplace health promotion contribute to job stress reduction?

Other authors have suggested that WHP-related activities may ameliorate the job stressor-strain relationship through either their availability (21-23) or via participation (24-26), Chapter 6 presented the first whole-of-population study jointly examining these relationships with a specific focus on comprehensive WHP. To recap, the availability of WHP may be perceived by employees as a form of organisational support because it shows employer care for staff health and well-being (23,27). Further, WHP availability may serve to enhance general health awareness and reduce stigma associated with disclosing health-related issues within workforces (20). Participation in programs may act as a form of

recovery from job stress by enabling psychological detachment, relaxation or control from task-related stressors (28,29).

In contrast with the results from Chapter 5 no links were found between participation in Healthy@Work programs and ERI in either 2010 or 2013. Program effectiveness may have been a factor in these results. However, higher availability of WHP was associated with lower ERI. For women, WHP seemed to contribute to a sense of organisational support, thereby enhancing their self-esteem. Men did not seem to gain meaningful sense of social exchange from WHP; their ERI scores were higher in 2013. For men, the results suggested that more traditional forms of stress management intervention may have been of benefit.

Considering the evidence provided for prevalence of men's mental ill-health in the workforce from Chapters 3, 4 and 6, stress-related interventions appear a priority for this group in the Tasmanian Government. Evidence remains modest for job-based interventions, but strategies enhancing employee control over their work (30,31) and focusing on participation in decision making have support (32). Overall, availability of WHP was related to a sense of reward, via enhanced self-esteem, for women and WHP participation associated with a lower perceived in men. But as was noted in Chapter 6, these components each represent only part of the Effort-Reward equation so we would expect that magnitudes of effect were always likely to be modest. Therefore, job security, promotion prospects, and program quality needs to continued workplace attention. Selected and indicated approaches, which are more intensive, may be more effective where psychosocial risk has been clearly identified.

7.2 Implications of findings

7.2.1 Integrating workplace mental health protection and promotion

Bringing these findings together, it is worth reflecting first on how the research in this thesis contributes to frameworks for mental health promotion in the workplace. Comprehensive WHP is not a theory; it is a relatively new general program framework. As noted earlier, these types of universal interventions are

likely to produce modest results on mental health at a whole-of-workforce level (33). The framework provides broad scope and flexibility of application but a limited description of how its elements interact to effect outcomes. Importantly, although employee mental health is occasionally mentioned in literature on comprehensive WHP in the United States, it has rarely been researched as a specific health outcome from these programs [e.g. (34)].

Originating in North America, this ‘comprehensive’ approach has evolved from decades of WHP practices that have been targeted at individual physical health rather than mental health or its organisational-level intervention (35,36). As a result there is a limited literature on how the framework’s top-down approach translates into mental health differences at the individual level. A better understanding of these mechanisms may have enabled more precise measurement of how WHP relates to the mental health outcomes identified here. In its original form, WHP was viewed as a ‘poor cousin’ to occupational health and safety as a mechanism for improving worker health with the latter intervention receiving greater management-level attention due to its legal ramifications. This type of competition influenced the level at which WHP was embedded in workplaces and thus its sustainability (37). Comprehensive WHP seems likely to face similar challenges unless it is actively partnered with workplace health and safety initiatives for long-term health outcomes.

Furthermore, in Australia WHP programs incur a Fringe Benefits Tax as it is viewed as a form of remuneration other than salary and a private ruling must be obtained from the Commissioner of Taxation to gain an exemption. Some elements of comprehensive WHP are exempt from Fringe Benefits Tax, such as workplace counselling (including education and information seminars) and health risk assessments (if conducted by a qualified health professional) (38). This means there is an additional cost for employers to implement these programs over and above that of many of the activities involved. This barrier needs to be removed by government if employers are to sustainably adopt WHP in comprehensive forms likely to impact chronic health conditions.

There has been growing interest in the concept of integrated worker health promotion and protection strategies around the world (37,39,40), with a current

example being the Total Worker Health strategy advocated by the National Institute for Occupational Safety and Health in the United States (41). Commentary is also increasing for stronger legislation around the protection of worker mental health (42). But enhanced legislation may present a threat to mental health promotion if it narrows employer attention toward only reducing work stressors. Health-promoting work environments need to be created as well.

As was noted in Chapter 1, workforce productivity seems related to employee health, and can be achieved through health promotion that enables healthy choices and behaviours, through reduced exposure to workplace health and safety risks, and via reduced medical expenses and insurance premiums associated with ill-health (43). There is some existing evidence that strategies integrating WHP and protection have a greater effect on health behaviour change (44-46). This thesis shows how data obtained on worker mental ill-health, occupational mental disease and workplace intervention can be interpreted together to obtain a whole-of-workforce picture of mental health promotion. In principle, better integration of health protection and promotion strategies should sustain attention on worker health, and would align with multi-level approaches to embedding mental health interventions in organisations (47). In parallel, enhancement of legislation in relation to occupational mental health should broaden employer thinking away from traditional focus on physical health and safety. This would enable mental health promotion to evolve in workplaces so that intervention becomes more flexible in the face of its complex set of determinants.

Efficacy studies show that quality mental health promotion strategies as well as exposure to lifestyle interventions improve mental health (12,18). The complex aetiology of mental ill-health suggests that a preventive focus which combines physical and mental health intervention is a sound approach. The Chapter 5 results provided support for this argument by indicating that women's participation in programs addressing lifestyle-risk factors may have benefitted mental health. As noted earlier, the effectiveness of direct approaches to WHP in whole-of-population interventions needs further investigation. However, there are existing published recommendations for mental health promotion which

specify the combination of physical and mental interventions so as to improve i) understanding about their inter-related nature, ii) the quality of care for at-risk groups, iii) training for professionals involved with health intervention so that more comprehensive approaches are applied (12).

Other authors have suggested that mental health promotion in the workplace needs to take an approach that integrates intervention by i) reducing work stressors, ii) designing work so it presents opportunities for occupational, and personal growth and development, and iii) using work forums for addressing mental health issues more broadly (48). This approach is sophisticated but does not preclude the necessity to promote worker mental health through mental and physical avenues. Recent evidence is building a case that common mental disorders (CMDs) may be linked to changes towards processed food diets and reductions in physical activity. Lifestyle risk factors, such as smoking, and alcohol and drug abuse all contribute to the presence of CMDs (49).

7.2.2 Translational research in a partnership context

The concept of undertaking research that can be translated into real-world environments has been promoted for many years. The goals of Healthy@Work were primarily focused on organisational change and development so that employee health became a component of the Tasmanian government's functions. Arguably, actual shifts in health were a secondary consideration. The Healthy@Work closure review (50) highlighted achievement of its WHP goals across all Tasmanian Government organisations. Further, it was clear from audit information (Chapter 2) that the Tasmanian Government implemented a broad response to the 2010 partnership survey data on mental ill-health, significantly increasing the number of programs available that targeted mental health.

The findings from Chapters 5 and 6 did not show a difference in measures of mental health or job-stress that can clearly be linked to comprehensive WHP intervention. It seems reasonable to expect that the flow-on effects from a universal intervention that includes organisational system change could easily take longer than 3-years.

It seems reasonable to anticipate that different health issues will be prominent for different working populations, as was evident for mental health in this workforce. Therefore, more targeted measures are warranted and research designs should plan for supplementary data collection (e.g. interviews, focus groups, targeted surveys) to expand on the hypotheses generated from cross-sectional data.

Further, even though Healthy@Work was underway when this project commenced, not all government departments had started implementation of WHP strategies. It may have been possible to conduct process evaluations or efficacy studies within later-adopting departments as Healthy@Work interventions progressed. This information could have helped identify organisational or intervention-related factors contributing to health outcomes.

In addition, although audit data were available the annual audit forms were usually completed by a single departmental representative. A broader form of auditing, possibly by the person responsible for implementation at worksites (e.g. manager or team leader), would have possibly provided more precise data on implementation at the worksite level. In the future, researchers could collect data at a work-group level (e.g. function, locality, occupational group) over time. Information could be captured on WHP interventions (e.g. availability, pre- and post-intervention measures), work-group issues (e.g. organisational changes, competing initiatives, operational concerns) and health indicators (e.g. productivity).

7.2.3 Routine surveillance by employers, researchers and regulators

Employers

The commentary appended to Chapter 4 showed that Australian employers are legally liable (51) if they do not capture and respond to data on work organisation and psychosocial risk factors. These issues, along with potential productivity losses associated with presenteeism and absenteeism (52), highlight that employers need to take responsibility for collecting data and monitoring risks related to mental ill-health. Making surveillance a priority, ensuring high quality data are collected, and enacting strategic responses that make a difference

are all important actions for employers in relation to occupational stress. This means that routine surveying of health risks needs to be efficient as well as effective in collecting data that can be translated into action.

One approach would be to link routine employee surveys with administrative records, using ethically suitable processes to de-identify responses so that employee confidentiality is maintained. Alternatively, employers could collect more detailed socio-demographic and occupational data in routine surveys or randomly sample a group of employees to improve the quality of data returned from surveying processes. These approaches would give better reliability and validity of data.

Sensitivity and confidentiality is essential for accurate surveillance of, and intervention for mental ill-health. Stigma and discrimination related to mental ill-health prevent disclosure of problems, including job stress, in the workplace (14). Survey coordinators, leaders and managers need to be aware that their actions and decisions will be closely monitored by employees experiencing mental ill-health (53). Therefore, employers need to establish sound strategies and policies for tackling discrimination, accommodating mental illness and managing periods of absence from work (54). Comprehensive WHP may be a mechanism that enables action to address these strategies.

Researchers

Literature discussed in Chapter 1 identified that mental ill-health is prevalent in public sector workforces, with cross-country studies showing job stress is a significant contributor to this outcome. Therefore, it seems reasonable for future studies to anticipate the need for data collection on job stressors. However, the integration of management interventions for job stress with public health research on workplace mental health is a relatively recent notion (43). This means that best-practice measurement tools used by different disciplines are yet to evolve to the point where they can practically survey socio-demographic, work environment and other factors as well as identify how they effect health outcomes. The Partnering Healthy@Work survey made a strong attempt to cover these elements but had to omit key measures for practicality. The data collected using the K10 measure were important because they have provided an example

of how a gold-standard brief mental health measure can be applied effectively in a large and diverse work setting. It seems clear that employers need brief and informative measures about workplace influences on employee mental health. Therefore, mental health researchers can assist employers by identifying high contrast psychosocial measures (55), and by providing guidance or directing routine surveillance so that returned data are of good quality and enable effective translation into action [e.g. (56)].

Regulators

Regulators need to urgently enhance their structures and systems pertaining to occupational mental disease claims. Employers would be assisted if standardized information, measurement and reporting tools for investigating stress claims were available. With the decline of collective worker bargaining and unionism world-wide, workers compensation systems are a critical legal system for the protection of individual worker health (2). Chapters 1 and 4 suggested that these systems do not appear to be fulfilling that role in relation to occupational mental health. Stress claimants have been found likely to have worsened mental health at conclusion of a claims process when compared with non-claimants (57) and also be less likely to return to work (58). These are preventable issues that have flow-on effects for work disability. However, gaps in the regulatory database mean that it is not known with any consistency whether workers in Tasmania or Australia are following these work-ability trends. A range of recommendations for regulators were made in the commentary appended to Chapter 4.

7.3 Recommendations for future research

Although **Chapter 3** identified a range of socio-demographic, work and health correlates associated with high psychological distress, the study highlighted that job stress was a key contributor to mental ill-health in this workforce. Given that public sector workforces may be vulnerable to work stressors it is recommended that future studies of WHP include high contrast measures of work organisation and psychosocial factors. However, as was highlighted in this Chapter, researchers need to assist employers with the design of these measures so that they can be easily applied within routine workforce surveys.

Although **Chapter 4** identified features of stress claims, mechanisms of injury influencing other types of claims were not examined. Therefore it is recommended that further research is conducted to i) separate claims with a similarly complex aetiology to stress claims (e.g. musculoskeletal injuries) from simpler cases, ii) examine whether rates of claims are different for these groups to those of stress claims, iii) identify mechanisms of injury for complex claims to see whether there are psychosocial hazards to those found for stress claims. It is also recommended that stress and non-stress claim rates for the Tasmanian Government workforce are compared with national data for public sector workers using cost and time-based models by sex and age like those described in Chapter 4. This will provide greater clarity as to whether the trends observed in our study are generalizable to public sector workers more broadly.

Further, it is recommended from **Chapter 4** that further research on trends related to workers compensation data continues over time for the Tasmanian Government workforce. This will enable capture of new categories (e.g. open versus closed claims) as the WorkCover Tasmania database evolves and enhance the accuracy of findings.

The findings of **Chapter 5** identified that our exposure measure for direct forms of workplace mental health promotion grouped all types of interventions together. This measure also presented difficulties due to the differences in time periods for exposure between 2010 (past year) and 2013 (past 3 years). Future research is needed into whether direct interventions are related to mental health and these studies would benefit from i) separation of mental health program categories so as to determine their relative effectiveness, and ii) development of a standardised exposure measure for WHP so that results could more easily be benchmarked over time. Alternately, data could be collected and collated directly from pre- and post-program surveys for WHP, and these surveys could have embedded mental health measures.

Based on the findings in **Chapters 5 and 6**, further surveys of the employee health within the Tasmanian Government workforce are recommended. The 3-year period between the surveys described here may have been insufficient to capture the health effects of WHP at a population level. These chapters also

highlight the value of capturing these data at a work unit level so that i) bias is reduced, and ii) a clearer picture of factors influencing implementation of WHP is obtained.

Although both **Chapters 5 and 6** make the suggestion that work stressors or larger organisational factors could be contributing to the results, there is no clear evidence that these inferences are correct. Therefore future research should investigate how the work environment has contributed to differences in men and women's job stress and mental health. For men, it would be beneficial to examine how their perceived work efforts align with job stress, and to identify the factors contributing to the observed increases in effort reward imbalance.

In examining future directions for WHP research discussed in this chapter, systematic reviews of i) combined workplace health protection and promotion programs is warranted given the growing calls for their application, and ii) the effectiveness of changes to WHS legislation, that includes wording on mental health and wellbeing, is needed.

7.4 Conclusions

This thesis identified that mental health promotion in Australian workplaces is entering a new phase of evolution due to the introduction of work, health and safety legislation that places the onus on employers to monitor and intervene for work-related hazards. These changes highlight the need for, and importance of quality routine data collection on employee mental health. Regular surveillance, up-to-date regulatory data and evidence-based interventions are needed if employers are to meet this challenge.

Comprehensive workplace health promotion can be a cost-effective, low risk, systems-based intervention that may offer universal benefits for mental health and job stress in public sector workforces. In this thesis, participation in WHP programs had a modest modifying effect on women's psychological distress over time. However, differences in their mental health, which were mainly associated with lifestyle-related program participation, were not observed after 3 years. Availability of WHP was also associated with lower job stress for women over time but its modifying effects were again small.

Bringing the evidence together, the promotion of mental health in workplaces may be enhanced if worker health protection and promotion strategies are better integrated, and include a focus on both mental and physical health. The studies presented in this thesis highlighted that men had higher proportions of high psychological distress and higher rates of stress-claims in this public sector workforce. However, comprehensive WHP was not an effective intervention for these male employees and alternative mental health and job stress strategies need to be considered for this group by the Tasmanian Government.

Further, individual health effects from universal interventions targeting systemic changes may not be observable via population surveillance methods after a 3-year period. Therefore, research designs involving at-scale health research need to take a longer-term view and should plan for supplementary data collection to expand on the hypotheses generated from cross-sectional data. Follow-up studies examining organisational context and program quality alongside this universal intervention need to be conducted to clarify the nature of the relationships observed in this thesis.

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Appendix A: Partnering Healthy@Work surveys 2010 and 2013

This section contains the full questionnaire forms used for the Partnering Healthy@Work surveys in 2010 and 2013. A review of content prior to the 2013 survey led to several changes, including in Section E where question 27 (subsequently question 32 in 2013) had extra activity categories added, and question 28 (question 33 in 2013), which had a change in formatting and the wording of the response period (converted from “past 12 months” to “past 3 years”). These questions formed the basis of the exposure variables for workplace health promotion “availability” and “participation”. These changes aimed to i) capture the full range of activities available by the 2013 year, ii) make the survey more user-friendly, and iii) include the whole period of the Healthy@Work intervention.

In the analyses described in Chapters 5 and 6, questions for 2013 were matched to those presented in 2010, and questions from 2010 were clustered to reflect the format for 2013 as closely as possible. This process meant that several new response categories present in 2013 were excluded, namely question 32 categories for drinking water, workplace wellness health champions and bicycle racks, and question 33d) on smoking. Preliminary statistical analyses of the datasets also led to the exclusion of the 33h) question on flu vaccination because it had artificially skewed the data.

Ideally, the surveys would have been conducted in each year of the Healthy@Work project but funding was only obtained for two data collection points. This situation meant that measurement of the period of exposure was challenging and the decision was ultimately taken to ask for recall over 3 years. Advice from biostatisticians assisting Partnering Healthy@Work projects indicated that adjustment of the 2013 response data for question 33 could artificially influence results because no a-priori assumptions were available on how Healthy@Work exposure occurred in the Tasmanian State Service. Further, the self-reported increases in workplace health promotion availability and participation appeared to mirror data obtained from the Tasmanian Government’s Healthy@Work audit processes (see Figure E-4), which showed the majority of initiatives became available in 2012. Chapters 5 and 6 explain the data analyses in more detail.

Partnering Healthy@Work survey 2010

ID NUMBER: _____

HEALTHY@WORK QUESTIONNAIRE

This questionnaire asks for some general information about you, as well as some information about your physical and emotional health, your diet and physical activity, and your employment.

Instructions: Please read carefully

Please answer all questions to the best of your ability (leave blank if unknown).

Your answers will be completely confidential.

Indicate your response by filling in the circle next to the most appropriate answer.

Example:

Shade circles like this	<input checked="" type="radio"/>
Not like this	<input type="radio"/> or <input checked="" type="radio"/>
Cross out mistakes like this	<input checked="" type="radio"/>

or by writing clearly using the boxes where provided.
Please use BLOCK LETTERS where required.

Example:

	4
--	---

 /

	3
--	---

 /

2	0	1	0
---	---	---	---

Cross out any mistakes and write the correct answer just below the relevant boxes.

Please use a black or blue pen if possible.

This section asks you some general questions about yourself.

- 190

SECTION B

These questions are about your diet and smoking tobacco.

1. How many serves of vegetables (excluding potatoes) do you usually eat each day? (One serve = $\frac{1}{2}$ cup cooked vegetables or 1 cup of salad vegetables)

- ☐ 1 serve or less
 ☐ 2 serves
 ☐ 3 serves
 ☐ 4 serves
 ☐ 5 serves
 ☐ 6 or more serves
☐ Don't eat vegetables

2. How many serves of fruit do you usually eat each day? (One serve = 1 medium piece of fruit or 1 cup of diced pieces)

- ☐ 1 serve or less
 ☐ 2 serves
 ☐ 3 serves
 ☐ 4 or more serves
☐ Don't eat fruit

3. How many times do you eat red meat in an average week, including sausages, luncheon meat, salami, meat pies, hamburger or bacon (but not including fish or poultry)?

- ☐ Ten or more times per week
☐ Five to nine times a week
☐ Three to four times a week
☐ Once or twice a week
☐ Less than once a week
☐ Never

4. How often do you eat fish or seafood in an average week?

- ☐ Six or more times a week
☐ Three to five times a week
☐ Once or twice a week
☐ Less than once a week
☐ I never eat fish for medical reasons
☐ I never eat fish for religious or ethical reasons
☐ I never eat fish for other reasons (*please specify*) _____

5. How many times per week would you usually eat hot takeaway meals? (e.g. pizza, burgers, fried or roast chicken, Chinese/Indian/Thai takeaway)

- ☐ I don't eat takeaway
☐ 1 meal or less per month
☐ 1 meal per week
☐ 2-3 meals per week
☐ 4-5 meals per week
☐ 6-7 or more meals per week

4

6. What type of milk do you usually consume?

- ☐ Condensed
- ☐ Full cream (normal milk)
- ☐ Almost equal amounts of full cream and reduced fat
- ☐ Reduced fat
- ☐ Skim
- ☐ None
- ☐ Other (please specify) _____

7. How often do you add salt to your food after it is cooked?

- ☐ Never
- ☐ Rarely
- ☐ Sometimes
- ☐ Almost always
- ☐ Always

8. How often do you have a drink containing alcohol?

- ☐ Never (skip to Q.11)
- ☐ Monthly or less
- ☐ 2 to 4 times a month
- ☐ 2 to 3 times a week
- ☐ 4 or more times a week

9. How many standard drinks do you have on a typical day when you are drinking? (Please refer to the Standard Drink Guide on the next page for examples of standard drinks).

- ☐ 1 or 2
- ☐ 3 or 4
- ☐ 5 or 6
- ☐ 7 to 9
- ☐ 10 or more

10. How often do you have 5 or more standard drinks on one occasion?

- ☐ Never
- ☐ Less than monthly
- ☐ Monthly
- ☐ Weekly
- ☐ Daily or almost daily

11. Over your lifetime, have you smoked at least 100 cigarettes or a similar amount of tobacco?

- ☐ Yes (Answer Q.12) ☐ No (Skip to Section C)

12. Have you ever been a daily smoker?

- ☐ Yes ☐ No (Skip to Section C)

12a) At what age did you start smoking daily?

years

12b) How often do you now smoke cigarettes, cigars, pipes or any other tobacco products?

- ☐ Daily (Skip to Section C)
☐ At least weekly (but not daily)
☐ Less often than weekly
☐ Not at all

12c) At what age did you finally stop smoking daily?

years

Standard Drink Guide



Source: Australian Government Department of Health and Ageing

SECTION C

These questions are about your current physical activities.

The following questions will ask you about the time you spent being physically active in the last 7 days. Please think about the activities you do at work, as a part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Please answer each question even if you do not consider yourself to be an active person.

Think about all the **vigorous** and **moderate** activities that you did in the **last 7 days**.

- **Vigorous** physical activities refer to activities that take **hard** physical effort and make you breathe much harder than normal.
- **Moderate** activities refer to activities that take moderate physical effort and make you breathe **somewhat** harder than normal.

PART 1: WORK-RELATED PHYSICAL ACTIVITY

The first section is about your work. This includes paid jobs, farming, volunteer work, course work, and any other unpaid work that you did outside your home.

Do not include unpaid work you might do around your home, like housework, yard work, general maintenance, and caring for your family. We ask about these in Part 3.

1. Do you currently have a job or do any unpaid work outside your home?

☐ Yes

☐ No → **Skip to PART 2: TRANSPORTATION**

The next questions are about all the physical activity you did in the last 7 days as part of your paid or unpaid work. This does not include travelling to and from work.

2. During the **last 7 days**, on how many days did you do vigorous physical activities like heavy lifting, digging, heavy construction, or climbing up stairs **as part of your work**? Think about only those physical activities that you did for **at least 10 minutes** at a time.

_____ days per week

☐ No vigorous job-related physical activity → **Skip to question 4**

3. How much time did you usually spend on one of those days doing vigorous physical activities as part of your work?

_____ hours per day

_____ minutes per day

4. Again, think about only those physical activities that you did for **at least 10 minutes** at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads as part of your work? *Please DO NOT include walking.*

_____ days per week

☐ No moderate job-related physical activity → **Skip to question 6**

5. How much time did you **usually** spend on one of those days doing **moderate** physical activities as part of your work?

_____ hours per day

_____ minutes per day

6. During the last 7 days, on how many days did you walk for **at least 10 minutes** at a time as part of your work? Please do not count any walking you did to travel to or from work.

_____ days per week

☐ No job-related walking → **Skip to PART 2: TRANSPORTATION**

7. How much time did you usually spend on **one** of those days **walking** as part of your work?

_____ hours per day

_____ minutes per day

PART 2: TRANSPORTATION PHYSICAL ACTIVITY

These questions are about how you travelled from place to place, including to places like work, stores, movies, and so on.

8. During the last 7 days, on how many days did you travel **in a motor vehicle** like a train, bus, car, or tram?

_____ days per week

☐ No travelling in a motor vehicle → **Skip to question 10**

9. How much time did you **usually** spend in a motor vehicle on **one** of those days?

_____ hours per day

_____ minutes per day

Now think only about the cycling and walking you might have done to travel to and from work, to do errands, or to go from place to place.

10. During **the last 7 days**, on how many days did you **cycle** for **at least 10 minutes** at a time to go from place to place?

_____ days per week

☐ No bicycling from place to place → **Skip to question 12**

8

11. How much time did you usually spend on **one** of those days **cycling** from place to place?
- _____ hours per day
_____ minutes per day
12. During the last 7 days, on how many days did you **walk** for **at least 10 minutes** at a time to go from place to place?
- _____ days per week
- ☐ No walking from place to place → **Skip to PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY**
13. How much time did you usually spend on **one** of those days **walking** from place to place?
- _____ hours per day
_____ minutes per day

PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

This section is about some of the physical activities you might have done in the last 7 days in and around your home, like housework, gardening, yard work, general maintenance work, and caring for your family.

YARD WORK:

14. Think about only those physical activities that you did for at **least 10 minutes** at a time. During **the last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, chopping wood, or digging in the garden or yard?
- _____ days per week
- ☐ No vigorous activity in garden or yard → **Skip to question 16**
15. How much time did you usually spend on **one** of those days doing **vigorous** physical activities **in the garden or yard**?
- _____ hours per day
_____ minutes per day
16. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do **moderate** activities like carrying light loads, sweeping, washing windows, and raking **in the garden or yard**?
- _____ days per week
- ☐ No moderate activity in garden or yard → **Skip to question 18**
17. How much time did you usually spend on one of those days doing **moderate** physical activities **in the garden or yard**?
- _____ hours per day
_____ minutes per day

HOUSEWORK

18. Once again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do **moderate** activities like carrying light loads, washing windows, scrubbing floors and sweeping **inside your home**?

_____ days per week

- ☐ No moderate activity inside home → **Skip to PART 4: RECREATION, SPORT AND LEISURE-TIME PHYSICAL ACTIVITY**

19. How much time did you usually spend on one of those days doing **moderate** physical activities **inside your home**?

_____ hours per day

_____ minutes per day

PART 4: RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY

This section is about all the physical activities that you did in the last 7 days solely for recreation, sport, exercise or leisure. Please do not include any activities you have already mentioned.

20. Not counting any walking you have already mentioned, during the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **in your leisure time**?

_____ days per week

- ☐ No walking in leisure time → **Skip to question 22**

21. How much time did you usually spend on one of those days **walking** in your leisure time?

_____ hours per day

_____ minutes per day

22. Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like aerobics, running, fast bicycling, or fast swimming **in your leisure time**?

_____ days per week

- ☐ No vigorous activity in leisure time → **Skip to question 24**

23. How much time did you usually spend on one of those days doing **vigorous** physical activities in your leisure time?

_____ hours per day

_____ minutes per day

10

24. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis **in your leisure time**?

_____ days per week

☐ No moderate activity in leisure time → *Skip to PART 5: TIME SPENT SITTING*

25. How much time did you usually spend on one of those days doing **moderate** physical activities in your leisure time?

_____ hours per day
_____ minutes per day

PART 5: TIME SPENT SITTING

These last questions are about the time you spend sitting while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television.
Do not include any time spent sitting in a motor vehicle that you have already told us about.

26. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekday**?

_____ hours per day
_____ minutes per day

27. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekend day**?

_____ hours per day
_____ minutes per day

Now we would like to know about the time you spend at your workplace on a typical day.

28. Please estimate the time that you spend **at your workplace** on a typical day.

_____ hours per day
_____ minutes per day

29. Please estimate the time that you spend **sitting at your workplace**, including during meal and snack breaks, on a typical day.

_____ hours per day
_____ minutes per day

30. How many times on a typical day, while at your workplace, do you **interrupt your sitting**? For example, by standing up, walking somewhere, or getting a coffee.

_____ times

SECTION D

This section is about your health.

1. How tall are you without shoes? cm **OR** ft in
2. (Females only) Are you currently pregnant? ☐ Yes (Skip to Q.5)
☐ No
3. How much do you weigh? kg **OR** st lb
4. How much would you like to weigh now? (Select **only one**)
- ☐ Happy as I am
☐ 1 – 5 kg more
☐ Over 5 kg more
 ☐ 1 – 5 kg less
☐ 6 – 10 kg less
☐ Over 10 kg less

The following questions ask for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities.

5. In general, would you say your health is:

☐ Excellent ☐ Very good ☐ Good ☐ Fair ☐ Poor

6. The following questions are about activities you might do during a typical day. Does your health **now limit you** in these activities? If so, how much?

	YES, limited a lot	YES, limited a little	NO, not limited at all
6a) <u>Moderate activities</u> , such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6b) Climbing <u>several</u> flights of stairs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. During the **past 4 weeks**, how much of the time have you had any of the following problems with your work or other regular daily activities **as a result of your physical health**?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
7a) <u>Accomplished less</u> than you would like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7b) Were limited in the <u>kind</u> of work or other activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12

8. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
8a) Accomplished less than you would like.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8b) Did work or other activities <u>less carefully than usual</u>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

Not at all	A little bit	Moderately	Quite a bit	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the <u>past 4 weeks</u> :	All of the time	Most of the time	Some of the time	A little of the time	None of the time
10a) Have you felt calm and peaceful?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10b) Did you have a lot of energy?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10c) Have you felt downhearted and depressed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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12. Do you currently have any of the following conditions?

	Yes	No
a) Arthritis or rheumatism	<input type="radio"/>	<input type="radio"/>
b) Chronic back pain	<input type="radio"/>	<input type="radio"/>
c) Migraine headaches	<input type="radio"/>	<input type="radio"/>
d) Other frequent or severe headaches	<input type="radio"/>	<input type="radio"/>
e) Any other chronic pain	<input type="radio"/>	<input type="radio"/>
f) High blood pressure or hypertension	<input type="radio"/>	<input type="radio"/>
g) Congestive heart failure	<input type="radio"/>	<input type="radio"/>
h) Coronary heart disease	<input type="radio"/>	<input type="radio"/>
i) High blood cholesterol	<input type="radio"/>	<input type="radio"/>
j) An ulcer in your stomach or intestine	<input type="radio"/>	<input type="radio"/>
k) Irritable bowel disorder	<input type="radio"/>	<input type="radio"/>
l) Chronic heart burn or gastroesophageal reflux disease	<input type="radio"/>	<input type="radio"/>
m) Asthma	<input type="radio"/>	<input type="radio"/>
n) Chronic bronchitis or emphysema	<input type="radio"/>	<input type="radio"/>
o) Seasonal allergies or hay fever	<input type="radio"/>	<input type="radio"/>
p) Chronic Obstructive Pulmonary Disease	<input type="radio"/>	<input type="radio"/>
q) Urinary or bladder problems	<input type="radio"/>	<input type="radio"/>
r) Diabetes	<input type="radio"/>	<input type="radio"/>
s) Obesity	<input type="radio"/>	<input type="radio"/>
t) Chronic sleeping problems	<input type="radio"/>	<input type="radio"/>
u) Chronic fatigue or low energy	<input type="radio"/>	<input type="radio"/>
v) Osteoporosis	<input type="radio"/>	<input type="radio"/>
w) Skin cancer	<input type="radio"/>	<input type="radio"/>
x) Any other type of cancer	<input type="radio"/>	<input type="radio"/>

13. How many times in the last 12 months have you been admitted overnight or longer in any hospital for any reason?
 times
14. In the past 12 months, how many nights in total did you stay in hospital?
 nights

14

The following ten questions ask about how you have been feeling in the last four weeks. For each question, fill in the circle under the option that best describes the amount of time you felt that way.

	None of the time	A little of the time	Some of the time	Most of the time	All of the time
15. In the past 4 weeks about how often did you feel tired out for no good reason?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. In the past 4 weeks about how often did you feel nervous?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. In the past 4 weeks about how often did you feel so nervous that nothing could calm you down?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. In the past 4 weeks about how often did you feel hopeless?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. In the past 4 weeks about how often did you feel restless or fidgety?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. In the past 4 weeks about how often did you feel so restless you could not sit still?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. In the past 4 weeks about how often did you feel depressed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. In the past 4 weeks about how often did you feel that everything was an effort?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23. In the past 4 weeks about how often did you feel so sad that nothing could cheer you up?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. In the past 4 weeks about how often did you feel worthless?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

SECTION E

These questions are about your employment in the Tasmanian state service.

1. Do you have **more than one** paid position in the Tasmanian state service?

- ☐ No (Skip to Q. 3)
☐ Yes

2. Please specify what you consider to be your main job

Agency _____
 Job Title _____

Please answer all questions in Section E in relation to your main job in the Tasmanian state service

3. On which days of the week to you **usually** work?

- ☐ Five days a week Monday to Friday
☐ Days vary from week to week
☐ Other – please specify days below
☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday ☐ Sunday

4. Which of the following options best describe your current work schedule?

Please choose all that apply

- | | |
|--|--|
| <input type="radio"/> A regular daytime schedule | <input type="radio"/> A regular evening shift |
| <input type="radio"/> A regular night shift | <input type="radio"/> A rotating shift (changes from days to evenings to nights) |
| <input type="radio"/> Split shift (two distinct periods per day) | <input type="radio"/> On call |
| <input type="radio"/> Irregular schedule | <input type="radio"/> Other – please specify _____ |

5. How many hours per week do you **usually** work? Include any paid or unpaid overtime.

This includes any work done at the workplace and at home. Don't include time 'on-call'.

hours per week

6. If you could choose the number of hours you work each week, and taking into account how that would affect your income, would you prefer to work:

- ☐ Fewer hours than you do now?
☐ About the same hours as you do now?
☐ More hours than you do now?

7. How many days in the last 4 weeks have you **stayed away from your work** for more than half the day because of health problems?

days

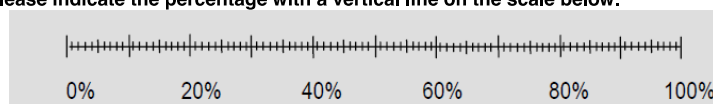
8. How many days in the last 4 weeks did you **go to work while suffering from health problems?**

days

9. On these days when you went to work suffering from health problems, what percentage of your time were you as productive as usual?

For example, if you were exactly as productive as usual please mark '100 %'.

Please indicate the percentage with a vertical line on the scale below.



The following items refer to your main job in the Tasmanian state service. For each of the following statements, please indicate to what degree it reflects your situation. Thank you for answering all statements!

10. I have constant time pressure due to a heavy work load.

- Disagree..... ☐
 Agree, but I am not at all distressed..... ☐
 Agree, and I am somewhat distressed..... ☐
 Agree, and I am distressed..... ☐
 Agree, and I am very distressed..... ☐

11. I have many interruptions and disturbances while performing my job.

- Disagree..... ☐
 Agree, but I am not at all distressed..... ☐
 Agree, and I am somewhat distressed..... ☐
 Agree, and I am distressed..... ☐
 Agree, and I am very distressed..... ☐

12. I have a lot of responsibility in my job.

- Disagree..... ☐
 Agree, but I am not at all distressed..... ☐
 Agree, and I am somewhat distressed..... ☐
 Agree, and I am distressed..... ☐
 Agree, and I am very distressed..... ☐

13. I am often pressured to work overtime.

- Disagree..... ☐
 Agree, but I am not at all distressed..... ☐
 Agree, and I am somewhat distressed..... ☐
 Agree, and I am distressed..... ☐
 Agree, and I am very distressed..... ☐

14. My job is physically demanding.

- Disagree..... ☐
 Agree, but I am not at all distressed..... ☐
 Agree, and I am somewhat distressed..... ☐
 Agree, and I am distressed..... ☐
 Agree, and I am very distressed..... ☐

15. Over the past few years, my job has become more and more demanding.

- Disagree..... ☐
 Agree, but I am not at all distressed..... ☐
 Agree, and I am somewhat distressed..... ☐
 Agree, and I am distressed..... ☐
 Agree, and I am very distressed..... ☐

- 16. I receive the respect I deserve from my superiors.**
 Not applicable (no superiors)..... ☐
 Agree..... ☐
 Disagree, but I am not at all distressed..... ☐
 Disagree, and I am somewhat distressed... ☐
 Disagree, and I am distressed..... ☐
 Disagree, and I am very distressed..... ☐
- 17. I receive the respect I deserve from my colleagues.**
 Not applicable (no colleagues)..... ☐
 Agree..... ☐
 Disagree, but I am not at all distressed..... ☐
 Disagree, and I am somewhat distressed... ☐
 Disagree, and I am distressed..... ☐
 Disagree, and I am very distressed..... ☐
- 18. I experience adequate support in difficult situations.**
 Agree..... ☐
 Disagree, but I am not at all distressed..... ☐
 Disagree, and I am somewhat distressed... ☐
 Disagree, and I am distressed..... ☐
 Disagree, and I am very distressed..... ☐
- 19. I am treated unfairly at work.**
 Disagree..... ☐
 Agree, but I am not at all distressed..... ☐
 Agree, and I am somewhat distressed..... ☐
 Agree, and I am distressed..... ☐
 Agree, and I am very distressed..... ☐
- 20. My job promotion prospects are poor.**
 Disagree..... ☐
 Agree, but I am not at all distressed..... ☐
 Agree, and I am somewhat distressed..... ☐
 Agree, and I am distressed..... ☐
 Agree, and I am very distressed..... ☐
- 21. I have experienced or I expect to experience an undesirable change in my work situation.**
 Disagree..... ☐
 Agree, but I am not at all distressed..... ☐
 Agree, and I am somewhat distressed..... ☐
 Agree, and I am distressed..... ☐
 Agree, and I am very distressed..... ☐

18

22. My employment security is poor.

- Disagree..... ☐
 Agree, but I am not at all distressed..... ☐
 Agree, and I am somewhat distressed..... ☐
 Agree, and I am distressed..... ☐
 Agree, and I am very distressed..... ☐

23. My current occupational position adequately reflects my education and training.

- Agree..... ☐
 Disagree, but I am not at all distressed..... ☐
 Disagree, and I am somewhat distressed... ☐
 Disagree, and I am distressed..... ☐
 Disagree, and I am very distressed..... ☐

24. Considering all my efforts and achievements, I receive the respect and prestige I deserve at work.

- Agree..... ☐
 Disagree, but I am not at all distressed..... ☐
 Disagree, and I am somewhat distressed... ☐
 Disagree, and I am distressed..... ☐
 Disagree, and I am very distressed..... ☐

25. Considering all my efforts and achievements, my job promotion prospects are adequate.

- Agree..... ☐
 Disagree, but I am not at all distressed..... ☐
 Disagree, and I am somewhat distressed... ☐
 Disagree, and I am distressed..... ☐
 Disagree, and I am very distressed..... ☐

26. Considering all my efforts and achievements, my salary / income is adequate.

- Agree..... ☐
 Disagree, but I am not at all distressed..... ☐
 Disagree, and I am somewhat distressed... ☐
 Disagree, and I am distressed..... ☐
 Disagree, and I am very distressed..... ☐

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The following items are about health activities in your workplace for your main job in the Tasmanian state service.

27. Please indicate the amenities that are available. Choose all that apply.

- ☐ Space to hold activities ☐ Shower and change facilities
☐ Equipment storage areas ☐ Fruit baskets provided
☐ Lunch / break room ☐ Outdoor exercise areas for employees to use
☐ Onsite gymnasium / fitness centre ☐ Stairs / stair wells that can be used for exercise
☐ Bulletin boards or newsletters where health information is provided
☐ Healthy food options (e.g work meetings, on-site canteens or vending machines)
☐ Other (please specify) _____

28. Please indicate which workplace health and wellbeing activities were available in the past 12 months. If "Yes", please indicate the number of times you participated.

	Available in past 12 months		Number of times you participated in the past 12 months
	No	Yes	Please enter a number.
a) Health information seminars or workshops	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/>
b) Global Corporate Challenge	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/>
c) Organisation sport team / sport or activity days	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/>
d) Employee Assistance Program	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/>
e) Exercise or physical activity sessions	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/>
f) Injury prevention or rehabilitation	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/>
g) Allocated stretching or relaxing times	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/>
h) Regular health assessments	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/>
i) Cycle to work or walk to work activities / TravelSmart Workplace Program	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/>
j) Regular fitness assessments	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/>
k) Personal development opportunities for life skills	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/>
l) Flu vaccination	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/>
m) Stress management program or strategies	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/>
n) Subsidised membership to off-site facilities/programs	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/>
o) 'Walk and talk' or active meetings	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/>
p) Flexible work arrangements	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/>
q) Other (please specify) _____	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/>

29. In the past 12 months, did you spend any of your own money to take part in any of the above activities?

- ☐ No ☐ Yes —————> Total amount you spent in dollars \$

Partnering Healthy@Work survey 2013

ID NUMBER: _____

partnering HEALTHY@WORK QUESTIONNAIRE

This questionnaire asks for some general information about you, as well as some information about your physical and emotional health, your diet and physical activity, and your employment.

Instructions: Please read carefully

Please answer all questions to the best of your ability (leave blank if unknown).

Your answers will be completely confidential.

Indicate your response by filling in the circle next to the most appropriate answer.

Example:

Shade circles like this ☒

Not like this ☐ or ☒

Cross out mistakes like this ☒

or by writing clearly using the boxes where provided.

Example:

	4
--	---

 /

	3
--	---

 /

2	0	1	3
---	---	---	---

Please use BLOCK LETTERS where required.

Cross out any mistakes and write the correct answer just below the relevant boxes.

Please use a black or blue pen if possible.

SECTION A

This section asks you some general questions about yourself.

1. Today's date: / / (dd/mm/yy)
2. Your date of birth: / / (dd/mm/yy)
3. What is your sex? ☐ Male ☐ Female
4. What is your current marital status? ☐ Single
☐ Married
☐ De facto
☐ Separated/Divorced
☐ Widowed
5. What is the highest level of education you have completed? (Select only one)
- ☐ Primary school
☐ Year 7, 8 or 9 or equivalent
☐ Year 10 or equivalent
☐ Year 12 or equivalent
☐ Trade/apprenticeship (e.g. *hairdresser, chef*)
☐ Certificate/diploma (e.g. *child care, technician*)
☐ University degree
☐ Higher university degree (e.g. *Grad Dip, Masters, PhD*)
6. What is the composition of your household?
- ☐ Couple family with children
☐ Couple family without children
☐ One parent family
☐ Group household
☐ Lone household
7. a) What would you say is the single most important thing you personally could do to improve your health or reduce your risk of getting sick? Write on the line below.
-
- b) For this change, which one applies to you now?
- ☐ I am not thinking of making this change
☐ I am thinking about making this change, but not in the next fortnight
☐ I am thinking about making this change in the next fortnight or so
☐ I am trying to make this change at the moment

SECTION B

These questions are about your diet and smoking tobacco.

1. How many serves of vegetables (excluding potatoes) do you usually eat each day?
(One serve = $\frac{1}{2}$ cup cooked vegetables or 1 cup of salad vegetables)
 - ☐ 1 serve or less ☐ 2 serves ☐ 3 serves ☐ 4 serves ☐ 5 serves ☐ 6 or more serves
 - ☐ Don't eat vegetables

2. How many serves of fruit do you usually eat each day? (One serve = 1 medium piece of fruit or 1 cup of diced pieces)
 - ☐ 1 serve or less ☐ 2 serves ☐ 3 serves ☐ 4 or more serves
 - ☐ Don't eat fruit

3. How many times do you eat red meat in an average week, including sausages, luncheon meat, salami, meat pies, hamburger or bacon (but not including fish or poultry)?
 - ☐ Ten or more times per week
 - ☐ Five to nine times a week
 - ☐ Three to four times a week
 - ☐ Once or twice a week
 - ☐ Less than once a week
 - ☐ Never

4. How often do you eat fish or seafood in an average week?
 - ☐ Six or more times a week
 - ☐ Three to five times a week
 - ☐ Once or twice a week
 - ☐ Less than once a week
 - ☐ I never eat fish for medical reasons
 - ☐ I never eat fish for religious or ethical reasons
 - ☐ I never eat fish for other reasons (please specify) _____

5. How many times per week would you usually eat hot takeaway meals?
(e.g. pizza, burgers, fried or roast chicken, Chinese/Indian/Thai takeaway)
 - ☐ I don't eat takeaway
 - ☐ 1 meal or less per month
 - ☐ 1 meal per week
 - ☐ 2-3 meals per week
 - ☐ 4-5 meals per week
 - ☐ 6-7 or more meals per week

6. What type of milk do you usually consume?

- ☐ Condensed
- ☐ Full cream (normal milk)
- ☐ Almost equal amounts of full cream and reduced fat
- ☐ Reduced fat
- ☐ Skim
- ☐ None
- ☐ Other (*please specify*) _____

7. How often do you add salt to your food after it is cooked?

- ☐ Never
- ☐ Rarely
- ☐ Sometimes
- ☐ Almost always
- ☐ Always

8. How many days per week do you usually have something to eat for breakfast?

- ☐ Rarely or never
- ☐ 1-2 days
- ☐ 3-4 days
- ☐ 5 or more days
- ☐ Don't know/varies/depends

9. How often do you have a drink containing alcohol?

- ☐ Never (**skip to Q.12**)
- ☐ Monthly or less
- ☐ 2 to 4 times a month
- ☐ 2 to 3 times a week
- ☐ 4 or more times a week

**10. How many standard drinks do you have on a typical day when you are drinking?
(Please refer to the Standard Drink Guide on the next page for examples of standard drinks).**

- ☐ 1 or 2
- ☐ 3 or 4
- ☐ 5 or 6
- ☐ 7 to 9
- ☐ 10 or more

11. How often do you have 5 or more standard drinks on one occasion?

- ☐ Never
- ☐ Less than monthly
- ☐ Monthly
- ☐ Weekly
- ☐ Daily or almost daily

Standard Drink Guide

		
1.1 285ml Full Strength Beer 4.9% Alc./Vol	1.6 425ml Full Strength Beer 4.9% Alc./Vol	0.8 285ml Mid Strength Beer 3.5% Alc./Vol
		
1.2 285ml Mid Strength Beer 3.5% Alc./Vol	0.9 425ml Light Beer 2.7% Alc./Vol	
		
1.5 375ml Full Strength Beer 4.9% Alc./Vol	1 375ml Mid Strength Beer 3.5% Alc./Vol	0.8 375ml Light Beer 2.7% Alc./Vol
		
1.5 375ml Pre-mix Spirits 5% Alc./Vol	1.2 300ml Pre-mix Spirits 5% Alc./Vol	1 30ml Spirit Nip 40% Alc./Vol
		
22 700ml Bottle of Spirits 40% Alc./Vol	1 30ml Spirit Shot 40% Alc./Vol	
		
1 60ml Port/Sherry Glass 20% Alc./Vol	1.5 170ml Average Serve of Sparkling Wine/ Champagne 11.5% Alc./Vol	1.5 150ml Average Serve of Wine 12.5% Alc./Vol
		
	7.5 750ml Bottle of Wine 12.5% Alc./Vol	

Source: Australian Government Department of Health and Ageing

12. Over your lifetime, have you smoked at least 100 cigarettes or a similar amount of tobacco?

- ☐ Yes (Answer Q.13) ☐ No (Skip to Section C)

13. Have you ever been a daily smoker?

- ☐ Yes ☐ No (Skip to Section C)

a) At what age did you start smoking daily?

years

b) How often do you now smoke cigarettes, cigars, pipes or any other tobacco products?

- ☐ Daily (Skip to Section C)
☐ At least weekly (but not daily)
☐ Less often than weekly
☐ Not at all

c) At what age did you finally stop smoking daily?

years

SECTION C

These questions are about your current physical activities.

The following questions will ask you about the time you spent being physically active in the last 7 days. Please think about the activities you do at work, as a part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Please answer each question even if you do not consider yourself to be an active person.

Think about all the **vigorous** and **moderate** activities that you did in the **last 7 days**.

- **Vigorous** physical activities refer to activities that take **hard** physical effort and make you breathe much harder than normal.
- **Moderate** activities refer to activities that take moderate physical effort and make you breathe **somewhat** harder than normal.

PART 1: WORK-RELATED PHYSICAL ACTIVITY

The first section is about your work. This includes paid jobs, farming, volunteer work, course work, and any other unpaid work that you did outside your home.

*Do **not** include unpaid work you might do around your home, like housework, yard work, general maintenance, and caring for your family. We ask about these in Part 3.*

1. Do you currently have a job or do any unpaid work outside your home?

☐ Yes

☐ No → **Skip to PART 2: TRANSPORTATION**

The next questions are about all the physical activity you did in the last 7 days as part of your paid or unpaid work. This does **not** include travelling to and from work.

2. During the **last 7 days**, on how many days did you do vigorous physical activities like heavy lifting, digging, heavy construction, or climbing up stairs **as part of your work**? Think about only those physical activities that you did for **at least 10 minutes** at a time.

_____ days per week

☐ No vigorous job-related physical activity → **Skip to question 4**

3. How much time did you usually spend on one of those days doing vigorous physical activities as part of your work?

_____ hours per day

_____ minutes per day

4. Again, think about only those physical activities that you did for **at least 10 minutes** at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads as part of your work? *Please DO NOT include walking.*

_____ days per week

☐ No moderate job-related physical activity → **Skip to question 6**

5. How much time did you **usually** spend on one of those days doing **moderate** physical activities as part of your work?

_____ hours per day

_____ minutes per day

6. During the last 7 days, on how many days did you walk for **at least 10 minutes** at a time as part of your work? Please do not count any walking you did to travel to or from work.

_____ days per week

☐ No job-related walking → **Skip to PART 2: TRANSPORTATION**

7. How much time did you usually spend on **one** of those days **walking** as part of your work?

_____ hours per day

_____ minutes per day

PART 2: TRANSPORTATION PHYSICAL ACTIVITY

These questions are about how you travelled from place to place, including to places like work, stores, movies, and so on.

8. During the last 7 days, on how many days did you travel in a **motor vehicle** like a train, bus, car, or tram?

_____ days per week

☐ No travelling in a motor vehicle → **Skip to question 10**

9. How much time did you **usually** spend in a motor vehicle on **one** of those days?

_____ hours per day

_____ minutes per day

Now think only about the cycling and walking you might have done to travel to and from work, to do errands, or to go from place to place.

10. During the **last 7 days**, on how many days did you **cycle** for **at least 10 minutes** at a time to go from place to place?

_____ days per week

☐ No bicycling from place to place → **Skip to question 12**

11. How much time did you usually spend on **one** of those days **cycling** from place to place?

_____ hours per day
 _____ minutes per day

12. During the last 7 days, on how many days did you **walk** for **at least 10 minutes** at a time to go from place to place?

_____ days per week

☐ No walking from place to place → **Skip to PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY**

13. How much time did you usually spend on **one** of those days **walking** from place to place?

_____ hours per day
 _____ minutes per day

PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

This section is about some of the physical activities you might have done in the last 7 days in and around your home, like housework, gardening, yard work, general maintenance work, and caring for your family.

YARD WORK:

14. Think about only those physical activities that you did for at **least 10 minutes** at a time. During **the last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, chopping wood, or digging in the garden or yard?

_____ days per week

☐ No vigorous activity in garden or yard → **Skip to question 16**

15. How much time did you usually spend on **one** of those days doing **vigorous** physical activities **in the garden or yard**?

_____ hours per day
 _____ minutes per day

16. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do **moderate** activities like carrying light loads, sweeping, washing windows, and raking **in the garden or yard**?

_____ days per week

☐ No moderate activity in garden or yard → **Skip to question 18**

17. How much time did you usually spend on **one** of those days doing **moderate** physical activities **in the garden or yard**?

_____ hours per day
 _____ minutes per day

HOUSEWORK

18. Once again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do **moderate** activities like carrying light loads, washing windows, scrubbing floors and sweeping **inside your home**?

_____ days per week

- ☐ No moderate activity inside home → **Skip to PART 4: RECREATION, SPORT AND LEISURE-TIME PHYSICAL ACTIVITY**

19. How much time did you usually spend on one of those days doing **moderate** physical activities **inside your home**?

_____ hours per day
_____ minutes per day

PART 4: RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY

This section is about all the physical activities that you did in the last 7 days solely for recreation, sport, exercise or leisure. Please do not include any activities you have already mentioned.

20. Not counting any walking you have already mentioned, during the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **in your leisure time**?

_____ days per week

- ☐ No walking in leisure time → **Skip to question 22**

21. How much time did you usually spend on one of those days **walking** in your leisure time?

_____ hours per day
_____ minutes per day

22. Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like aerobics, running, fast bicycling, or fast swimming **in your leisure time**?

_____ days per week

- ☐ No vigorous activity in leisure time → **Skip to question 24**

23. How much time did you usually spend on one of those days doing **vigorous** physical activities in your leisure time?

_____ hours per day
_____ minutes per day

24. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis **in your leisure time**?

_____ days per week

☐ No moderate activity in leisure time → *Skip to PART 5: TIME SPENT SITTING*

25. How much time did you usually spend on one of those days doing **moderate** physical activities in your leisure time?

_____ hours per day

_____ minutes per day

PART 5: TIME SPENT SITTING

These last questions are about the time you spend sitting while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television. *Do not include any time spent sitting in a motor vehicle that you have already told us about.*

26. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekday**?

_____ hours per day

_____ minutes per day

27. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekend day**?

_____ hours per day

_____ minutes per day

Now we would like to know about the time you spend at your workplace on a typical day.

28. Please estimate the time that you spend **at your workplace** on a typical day.

_____ hours per day

_____ minutes per day

29. Please estimate the time that you spend **sitting at your workplace**, including during meal and snack breaks, on a typical day.

_____ hours per day

_____ minutes per day

30. How many times on a typical day, while at your workplace, do you **interrupt your sitting**? For example, by standing up, walking somewhere, or getting a coffee.

_____ times

SECTION D

This section is about your health.

1. How tall are you without shoes? cm **OR** ft in
2. (Females only) Are you currently pregnant? ☐ Yes (Skip to Q.5)
☐ No
3. How much do you weigh? kg **OR** st lb
4. How much would you like to weigh now? (Select only one)
- | | |
|--------------------------------------|---------------------------------------|
| <input type="radio"/> Happy as I am | <input type="radio"/> 1 – 5 kg less |
| <input type="radio"/> 1 – 5 kg more | <input type="radio"/> 6 – 10 kg less |
| <input type="radio"/> Over 5 kg more | <input type="radio"/> Over 10 kg less |

The following questions ask for your views about your health. This information will help keep track of how you feel and how well you are able to do your usual activities.

5. In general, would you say your health is:

☐ Excellent ☐ Very good ☐ Good ☐ Fair ☐ Poor

6. The following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

	YES, limited a lot	YES, limited a little	NO, not limited at all
a) <u>Moderate</u> activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Climbing <u>several</u> flights of stairs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a) <u>Accomplished</u> less than you would like	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Were limited in the <u>kind</u> of work or other activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a) Accomplished less than you would like.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Did work or other activities less carefully than usual	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

Not at all	A little bit	Moderately	Quite a bit	Extremely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling.

How much of the time during the <u>past 4 weeks</u> :	All of the time	Most of the time	Some of the time	A little of the time	None of the time
a) Have you felt calm and peaceful?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Did you have a lot of energy?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Have you felt downhearted and depressed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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(IQOLA SF-12v2 Standard, English (Australia), 7/03)

12. Do you currently have any of the following conditions?

	Yes	No
a) Arthritis or rheumatism	<input type="radio"/>	<input type="radio"/>
b) Chronic back pain	<input type="radio"/>	<input type="radio"/>
c) Migraine headaches	<input type="radio"/>	<input type="radio"/>
d) Other frequent or severe headaches	<input type="radio"/>	<input type="radio"/>
e) Any other chronic pain	<input type="radio"/>	<input type="radio"/>
f) High blood pressure or hypertension	<input type="radio"/>	<input type="radio"/>
g) Congestive heart failure	<input type="radio"/>	<input type="radio"/>
h) Coronary heart disease	<input type="radio"/>	<input type="radio"/>
i) High blood cholesterol	<input type="radio"/>	<input type="radio"/>
j) An ulcer in your stomach or intestine	<input type="radio"/>	<input type="radio"/>
k) Irritable bowel disorder	<input type="radio"/>	<input type="radio"/>
l) Chronic heart burn or gastroesophageal reflux disease	<input type="radio"/>	<input type="radio"/>
m) Asthma	<input type="radio"/>	<input type="radio"/>
n) Chronic bronchitis or emphysema	<input type="radio"/>	<input type="radio"/>
o) Seasonal allergies or hay fever	<input type="radio"/>	<input type="radio"/>
p) Chronic Obstructive Pulmonary Disease	<input type="radio"/>	<input type="radio"/>
q) Urinary or bladder problems	<input type="radio"/>	<input type="radio"/>
r) Diabetes	<input type="radio"/>	<input type="radio"/>
s) Obesity	<input type="radio"/>	<input type="radio"/>
t) Chronic sleeping problems	<input type="radio"/>	<input type="radio"/>
u) Chronic fatigue or low energy	<input type="radio"/>	<input type="radio"/>
v) Osteoporosis	<input type="radio"/>	<input type="radio"/>
w) Skin cancer	<input type="radio"/>	<input type="radio"/>
x) Any other type of cancer	<input type="radio"/>	<input type="radio"/>

13. How many times in the last 12 months have you been admitted overnight or longer in any hospital for any reason? times

a) (Females only) How many of these times were for pregnancy or child birth?

 times**14. In the past 12 months, how many nights in total did you stay in hospital?** nights

a) (Females only) How many of these nights were due to pregnancy or child birth?

 nights

The following ten questions ask about how you have been feeling in the last four weeks. For each question, fill in the circle under the option that best describes the amount of time you felt that way.

	None of the time	A little of the time	Some of the time	Most of the time	All of the time
15. In the past 4 weeks about how often did you feel tired out for no good reason?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. In the past 4 weeks about how often did you feel nervous?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. In the past 4 weeks about how often did you feel so nervous that nothing could calm you down?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. In the past 4 weeks about how often did you feel hopeless?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. In the past 4 weeks about how often did you feel restless or fidgety?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. In the past 4 weeks about how often did you feel so restless you could not sit still?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. In the past 4 weeks about how often did you feel depressed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. In the past 4 weeks about how often did you feel that everything was an effort?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23. In the past 4 weeks about how often did you feel so sad that nothing could cheer you up?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. In the past 4 weeks about how often did you feel worthless?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

SECTION E

These questions are about your employment in the Tasmanian State Service.

1. Do you have **more than one** paid position in the Tasmanian State Service?

☐ No (Skip to Q. 3)
☐ Yes

2. Please specify what you consider to be your main job

Agency _____
 Job Title _____

Please answer all questions in Section E in relation to your main job in the Tasmanian State Service

3. On which days of the week do you **usually** work?

☐ Five days a week Monday to Friday
☐ Days vary from week to week
☐ Other – please specify days below
☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday ☐ Friday ☐ Saturday ☐ Sunday

4. Which of the following options best describe your current work schedule?

Please choose all that apply

☐ A regular daytime schedule ☐ A regular evening shift
☐ A regular night shift ☐ A rotating shift (changes from days to evenings to nights)
☐ Split shift (two distinct periods per day) ☐ On call
☐ Irregular schedule ☐ Other – please specify _____

5. How many hours per week do you **usually** work? Include any paid or unpaid overtime.

This includes any work done at the workplace and at home. Don't include time 'on-call'.

hours per week

6. If you could choose the number of hours you work each week, and taking into account how that would affect your income, would you prefer to work:

☐ Fewer hours than you do now?
☐ About the same hours as you do now?
☐ More hours than you do now?

7. How many days in the last 4 weeks have you **stayed away from your work** for more than half the day because of health problems?

days

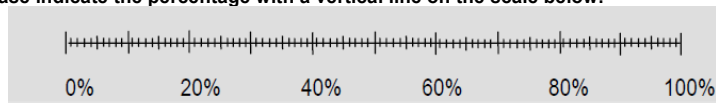
8. How many days in the last 4 weeks did you **go to work while suffering from health problems**?

days

9. On these days when you went to work suffering from health problems, what percentage of your time were you as productive as usual?

For example, if you were exactly as productive as usual please mark '100 %'.

Please indicate the percentage with a vertical line on the scale below.



The following items refer to your main job in the Tasmanian State Service. For each of the following statements, please indicate to what degree it reflects your situation.
Thank you for answering all statements!

10. I have constant time pressure due to a heavy work load.

- Disagree..... ☐
 Agree, but I am not at all distressed..... ☐
 Agree, and I am somewhat distressed..... ☐
 Agree, and I am distressed..... ☐
 Agree, and I am very distressed..... ☐

11. I have many interruptions and disturbances while performing my job.

- Disagree..... ☐
 Agree, but I am not at all distressed..... ☐
 Agree, and I am somewhat distressed..... ☐
 Agree, and I am distressed..... ☐
 Agree, and I am very distressed..... ☐

12. I have a lot of responsibility in my job.

- Disagree..... ☐
 Agree, but I am not at all distressed..... ☐
 Agree, and I am somewhat distressed..... ☐
 Agree, and I am distressed..... ☐
 Agree, and I am very distressed..... ☐

13. I am often pressured to work overtime.

- Disagree..... ☐
 Agree, but I am not at all distressed..... ☐
 Agree, and I am somewhat distressed..... ☐
 Agree, and I am distressed..... ☐
 Agree, and I am very distressed..... ☐

14. My job is physically demanding.

- Disagree..... ☐
 Agree, but I am not at all distressed..... ☐
 Agree, and I am somewhat distressed..... ☐
 Agree, and I am distressed..... ☐
 Agree, and I am very distressed..... ☐

- 15. Over the past few years, my job has become more and more demanding.**
- Disagree..... ☐
- Agree, but I am not at all distressed..... ☐
- Agree, and I am somewhat distressed..... ☐
- Agree, and I am distressed..... ☐
- Agree, and I am very distressed..... ☐
- 16. I receive the respect I deserve from my superiors.**
- Not applicable (no superiors)..... ☐
- Agree..... ☐
- Disagree, but I am not at all distressed..... ☐
- Disagree, and I am somewhat distressed... ☐
- Disagree, and I am distressed..... ☐
- Disagree, and I am very distressed..... ☐
- 17. I receive the respect I deserve from my colleagues.**
- Not applicable (no colleagues)..... ☐
- Agree..... ☐
- Disagree, but I am not at all distressed..... ☐
- Disagree, and I am somewhat distressed... ☐
- Disagree, and I am distressed..... ☐
- Disagree, and I am very distressed..... ☐
- 18. I experience adequate support in difficult situations.**
- Agree..... ☐
- Disagree, but I am not at all distressed..... ☐
- Disagree, and I am somewhat distressed... ☐
- Disagree, and I am distressed..... ☐
- Disagree, and I am very distressed..... ☐
- 19. I am treated unfairly at work.**
- Disagree..... ☐
- Agree, but I am not at all distressed..... ☐
- Agree, and I am somewhat distressed..... ☐
- Agree, and I am distressed..... ☐
- Agree, and I am very distressed..... ☐
- 20. My job promotion prospects are poor.**
- Disagree..... ☐
- Agree, but I am not at all distressed..... ☐
- Agree, and I am somewhat distressed..... ☐
- Agree, and I am distressed..... ☐
- Agree, and I am very distressed..... ☐
- 21. I have experienced or I expect to experience an undesirable change in my work situation.**
- Disagree..... ☐
- Agree, but I am not at all distressed..... ☐
- Agree, and I am somewhat distressed..... ☐
- Agree, and I am distressed..... ☐
- Agree, and I am very distressed..... ☐

- 22. My employment security is poor.**
- | | |
|--|-----------------------|
| Disagree..... | <input type="radio"/> |
| Agree, but I am not at all distressed..... | <input type="radio"/> |
| Agree, and I am somewhat distressed..... | <input type="radio"/> |
| Agree, and I am distressed..... | <input type="radio"/> |
| Agree, and I am very distressed..... | <input type="radio"/> |
- 23. My current occupational position adequately reflects my education and training.**
- | | |
|---|-----------------------|
| Agree..... | <input type="radio"/> |
| Disagree, but I am not at all distressed..... | <input type="radio"/> |
| Disagree, and I am somewhat distressed... | <input type="radio"/> |
| Disagree, and I am distressed..... | <input type="radio"/> |
| Disagree, and I am very distressed..... | <input type="radio"/> |
- 24. Considering all my efforts and achievements, I receive the respect and prestige I deserve at work.**
- | | |
|---|-----------------------|
| Agree..... | <input type="radio"/> |
| Disagree, but I am not at all distressed..... | <input type="radio"/> |
| Disagree, and I am somewhat distressed... | <input type="radio"/> |
| Disagree, and I am distressed..... | <input type="radio"/> |
| Disagree, and I am very distressed..... | <input type="radio"/> |
- 25. Considering all my efforts and achievements, my job promotion prospects are adequate.**
- | | |
|---|-----------------------|
| Agree..... | <input type="radio"/> |
| Disagree, but I am not at all distressed..... | <input type="radio"/> |
| Disagree, and I am somewhat distressed... | <input type="radio"/> |
| Disagree, and I am distressed..... | <input type="radio"/> |
| Disagree, and I am very distressed..... | <input type="radio"/> |
- 26. Considering all my efforts and achievements, my salary / income is adequate.**
- | | |
|---|-----------------------|
| Agree..... | <input type="radio"/> |
| Disagree, but I am not at all distressed..... | <input type="radio"/> |
| Disagree, and I am somewhat distressed... | <input type="radio"/> |
| Disagree, and I am distressed..... | <input type="radio"/> |
| Disagree, and I am very distressed..... | <input type="radio"/> |

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How far do you agree or disagree with the following statements?

		Strongly agree	Agree	Disagree	Strongly Disagree	Don't know
27.	I feel proud when I tell others I am part of my organisation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28.	I would recommend my organisation a great place to work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
29.	I feel a strong personal attachment to my organisation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
30.	My organisation inspires me to do the best in my job	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
31.	My organisation motivates me to help it achieve its objectives	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The following items are about health activities in your workplace for your main job in the Tasmanian State Service.

32. Please indicate the amenities/supports that are available. Choose all that apply.

- ☐ Space to hold activities
- ☐ Equipment storage areas
- ☐ Lunch / break room
- ☐ Onsite gymnasium / fitness centre
- ☐ Bicycle racks/storage
- ☐ Healthy vending machine options
- ☐ Workplace Wellness Health Champions
- ☐ Bulletin boards, newsletters, emails or websites where health information is provided
- ☐ Shower and change facilities
- ☐ Fruit baskets provided
- ☐ Outdoor exercise areas for employees to use
- ☐ Stairs / stair wells that can be used for exercise
- ☐ Healthy food options (e.g work meetings, on-site)
- ☐ Drinking water
- ☐ Flexible work arrangements
- ☐ Other (please specify) _____

33. Please indicate which workplace health and wellbeing activities were available in the past 3 years. If 'yes', please indicate the number of times you participated.

Type of health and wellbeing activities available	Available in the past 3 years		Number of times you participated in the past 3 years
	No	Yes	If yes, please enter a number
a) Education e.g. Health information seminars or workshops	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/>
b) Health assessments e.g. Health checks (BUPA/MBF health lounges), regular health assessments, regular fitness assessments, pre-employment health screening	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/>
c) Physical activity e.g. Global Corporate Challenge, Hydra-Walk, organisation sport team, sport or activity days, exercise or physical activity sessions (e.g. yoga, fit-ball, boot camp), active transport (e.g. TravelSmart Workplace Program, cycle to work or walk to work)	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/>
d) Smoking e.g. Smoking cessation programs (e.g. nicotine replacement, counselling)	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/>
e) Mental health and wellbeing e.g. Employee Assistance Programs, stress-management program or strategies, allocated stretching or relaxing times, massage, personal development opportunities for life skills, training or activities for mental health and wellbeing (e.g. Mental Health First Aid, Mindfulness, Flourishing People Happiness Training, <i>beyondblue</i>)	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/>
f) Interrupted sitting e.g. Exertime, Project Pause, standing work station	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/>
g) 'Walk and talk' or active meetings	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/>
h) Flu vaccination	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/>
i) Injury prevention/rehabilitation	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/>
j) Subsidised membership to off-site facilities or programs	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/>
k) Regular health and wellbeing activities facilitated by the organization e.g. walking/cycling groups	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/>
l) Other (Please specify) _____	<input type="radio"/>	<input type="radio"/>	<input type="text"/> <input type="text"/> <input type="text"/>

If you did not participate in any of the above activities, skip to question 35.

34. Did the workplace health and wellbeing activities listed in question 33 -

	Yes	No	Not sure
a) Help you to -			
Improve your health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Be more physically active	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quit smoking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eat more healthily	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drink less alcohol	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lose weight	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduce stress	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improve your performance at work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Give you the opportunity to -			
Be physically active	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eat more healthily	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Make you motivated to -			
Be physically active	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quit smoking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eat more healthily	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drink less alcohol	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Make it more affordable to -			
Be physically active	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eat more healthily	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Change the way you feel about -			
Your health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Being physically active	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quitting smoking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eating more healthily	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drinking alcohol	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your job	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

35. a) Please indicate how you feel about the following statements, even if you *did not* take part in any of the activities or programs listed in question 33.

	Strongly agree	Agree	Disagree	Strongly disagree
I was consulted in the design of the activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have the support of my managers to take part	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My organisation places a high priority on these activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My co-workers were interested in taking part	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The activities offered can improve my health and wellbeing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

35. b) In general, the activities were:

	Strongly agree	Agree	Disagree	Strongly disagree
Well publicised	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interesting to me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Relevant to my needs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Convenient to participate in	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Helpful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

36. Has anything prevented you from participating in the health and wellbeing activities offered through your workplace?

☐ No ☐ Yes

If yes, what? _____

37. Please indicate how you feel about the following statements even if you did not participate in any of the activities or programs listed in question 33.

	Strongly agree	Agree	Disagree	Strongly disagree
I am already doing enough outside of work to maintain my health and wellbeing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Problems with my health prevented me from participating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My health is not the responsibility of my employer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have trouble fitting these activities around my family/other commitments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There were no activities or programs available to me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am too busy at work to have time to participate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

38. In the past 3 years, did you spend any of your own money to take part in any of the workplace activities listed in question 33?

☐ No ☐ Yes

→ Total amount you spent in dollars \$

**THANK YOU FOR TAKING THE TIME TO COMPLETE THE SURVEY &
&
PLEASE RETURN THE SURVEY IN THE REPLY PAID ENVELOPE PROVIDED**

Appendix B: Band and occupational coding derivations

Method applied to establish categories for Band and Occupation

Although the Australia and New Zealand Standard Classification of Occupations (ANZSCO) coding was available within the Workforce Analysis and Collection Application (WACA) dataset, it was not used because a large portion of these data were incomplete, inconsistent or coded in ways that did not match industrial award descriptors (e.g. Education Manager, Band 2 = Manager under the ANZSCO coding where General Band 8 or Professional Band 4 would be equivalent to manager under the industrial awards).

To overcome these issues new Band and Occupational variables were developed from the WACA database using alternate variables named 'Industrial Award', 'Literal', and 'Annual Salary'. The Literal variable represented both the operational classifications and their hierarchical status, and so formed the basis of data referring to 'Band'. The Band variable was developed by first matching and recoding the Literal data to general and professional stream bands under the Tasmanian State Service Award (TSSA), and to police bands under the Police Award. Annual salary was used as the reference point for equivalence across general, professional and police bands, which had different numbering systems to denote hierarchy. The lowest or entry salary point for each band was used as the benchmark for equivalence. The salary scales in the published Police Award (as at 1/12/08 for the 2010 survey; as at 1/12/12 for the 2013 survey) and the TSSA (as at 5/03/09 for the 2010 survey; as at 6/12/12 for the 2013 survey) provided the data to match for approximate equivalence in salary (within \$500) as at time of WACA data extractions in Sept 2009 and December 2012.

When the Literal variable data were extracted for respondents, 26 different sub-awards, belonging under either the TSSA or Police Award were identified. These awards were grouped, based upon their essential occupational function into Administration (administration and clerical/ TSSA), Service (Community and

Health Services, Custodial Officers, Nurses, Police, Teachers, Port Arthur Authority), Emergency Services (Ambulance, Police, Tas Fire Service), Professional (Legal, Medical, Professional, Visiting Medical Professionals), Blue Collar (Health and Human Services, Miscellaneous Workers), and Other (occupations with < 5 respondents). After these initial changes, Occupation was then categorized as: blue collar, low white collar (administration); mid white collar; service; emergency service; professionals; manager; SES; other.

Appendix C: Stress-related workers compensation claims: Report 1

This appendix presents the workers compensation report produced by the author through a student placement with the Tasmanian Government. It provides descriptive data to supplement the information in Chapter 4.



Report 1

November | 12

Stress-related workers compensation claims in the Tasmanian State Service: 1 July 2007 to 30 June 2011

Lisa Jarman, Alison Venn, Leigh Blizzard & Kristy Sanderson
Menzies Research Institute Tasmania

About this report

This report provides demographic information drawn from the WorkCover database on stress-related workers compensation claims for the period 1 July 2007 to 30 June 2011. Special attention has been given to the frequency of claims for a select group of occupations as well as mechanisms of injury associated with perceptions of stress-related disease.

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Contents

EXECUTIVE SUMMARY	4
INTRODUCTION	6
RESEARCH CONTEXT	6
BACKGROUND	6
RESEARCH QUESTIONS	7
PURPOSE OF THIS REPORT	8
METHOD	9
WORKERS COMPENSATION DEFINITIONS AND PROCESSES	9
DATA SOURCE AND VARIABLES	9
VARIABLE DEFINITIONS	10
DATA ANALYSIS AND LIMITATIONS	11
RESULTS	12
SUMMARY OF WORKERS COMPENSATION CLAIMS BY TSS EMPLOYEES	12
SUMMARY OF RESULTS	26
LIMITATIONS	27
RECOMMENDATIONS	27
REFERENCES	28
APPENDIX 1: TABLES	29

Executive Summary

This research report has been prepared as part of the *Partnering Healthy@Work (pH@W)* collaborative initiative between the Tasmanian State Government and researchers at the Menzies Research Institute and University of Tasmania.

Coordination of occupational health, safety and well-being is a key responsibility of the Public Sector Management Office (PSMO), which represents the Tasmanian State Service (TSS) as an 'employer'. Enhanced coordination in this area is becoming an increasingly important issue within the TSS due to drivers including:

- The introduction of new compliance requirements via the Tasmanian *Work Health and Safety Bill 2011*;
- Trends showing rising costs per workers compensation claim; and
- Cessation of government-sponsored funding for the *Healthy@Work* initiative as at 30 June 2012.

The overall aim of this research was to examine the pattern and direct costs of stress-related WorkCover compensation claims in the TSS between 1 July 2007 and 30 June 2011. This paper reports on the results of the preliminary investigation of the distribution of stress claims versus all other claims in the TSS by variables including age, gender, occupation, leave days, cost and 'mechanism of injury'. Mechanism of injury refers to the claimant's perception of the workplace cause of the injury and covers categories including: trauma, violence, work pressure, bullying and harassment, and other mental stress factors.

The results indicate:

- The total number of new workers compensation claims in the TSS during the 1 July 2007 to 30 June 2011 period ranged from 1,461 (12.1% stress-related) in 2009-10 to 1,604 (12.0% stress-related) in 2010-11. WorkCover Tasmania data showed that the proportion of stress-related workers compensation claims, relative to all claims submitted appeared consistent during this period.
- Women submitted a higher proportion of compensation claims than men during the 4-year period examined. The percentage of total claims made by women ranged from 58.2% (934/1604) in 2010-11 to 63.3% (967/1527) in 2008-09. However, in the 2010-11 year stress-related claim rates per 1000 employees were higher for men (5.03) than women (2.91).
- During the period from 1 July 2007 to 30 June 2011, the proportions of stress-related claims by age ranged from 1.2% (9/737) in the 16 to 24 year category to 44.6% (329/737) in the 45 to 54 year category.
- In the 2010-11 year, the rate of stress-related claims per 1000 employees decreased markedly across all age categories from that of the previous financial year. The 2009-10 year rates ranged from 4.13 (16 to 24 years) to 8.3 (45 to 54 years) claims per 1000 employees; the 2010-11 financial year ranged

from 0.83 claims (16 to 24 years) to 4.35 claims (35-44years) per 1000 employees.

- Stress-related claims present a far higher burden for the TSS for average leave days and average cost than non-stress-related claims. On average, stress-related claims accounted for 81% (321/394) of all compensation-related leave days in the 4 year period. The proportion of total workers compensation costs allocated to stress-related claims ranged from 75.2% (\$28,468/\$37,848) in 2007-08 to 82.1% (\$27,520/\$33,526) in 2009-10. Data for leave days and costs are incomplete for the 2010-2011 year due to ongoing claims within the dataset.
- Work pressure was the most common type of mechanism of injury cited across all financial years, accounting for 59% (435/737) of all stress-related claims. It is a general classification name for a range of factors including: work backlogs, deadlines, responsibilities and organisational restructuring; interpersonal conflict with peers and supervisors; performance counseling, job disciplinary action and job promotion disappointment.

Introduction

Research Context

This research report has been prepared as part of the *Partnering Healthy@Work (pH@W)* collaborative initiative between the Tasmanian State Government and researchers at the Menzies Research Institute and University of Tasmania. With funding from a NHMRC Partnership Project Grant (# 544954) for the period 2010 to 2014, the health and economic benefits of the *Healthy@Work* project are being evaluated to address the feasibility, effectiveness and sustainability of workplace health promotion. NHMRC Partnership Projects have been funded to create new opportunities for researchers and policy makers to not only work together to define research questions and undertake research, but also to interpret and implement the findings.

Partnering Healthy@Work funding from the NHMRC also supports the appointment of PhD candidates to undertake research into health promotion in the workplace. Investigators on the project have agreed to 100-hour student placements with project partners in the Tasmanian State Service (TSS). This research project was negotiated as a placement within the Public Sector Management Office (PSMO).

Background

Coordination and promotion of occupational health, safety and well-being is a key responsibility of the Public Sector Management Office (PSMO), which represents the Tasmanian State Service (TSS) as an 'employer'. Enhanced coordination in this area is becoming an increasingly important issue within the TSS due to drivers including:

- The introduction of new compliance requirements via the Tasmanian *Work Health and Safety Bill 2011*;
- Trends showing rising costs per workers compensation claim (1,2); and
- Cessation of government-sponsored funding for the *Healthy@Work* initiative as at 30 June 2012.

In 2002 a national occupational health and safety (OHS) strategy was agreed by state and federal governments, business and union representatives. It aimed to improve the health and safety of workers and included an initial target of reducing "*the incidence of workplace injury by at least 40% by June 2012*". Between 2002 and 2011 there was a 25% decrease in injury incidence rates nationally. In the same period, the Tasmanian sector had a 12% decrease in incidence. A recent WorkCover report (1) has highlighted that stress-related claims, which are typically categorized as mental diseases under compensation legislation, are not specifically mentioned within national targets but appear to be a major contributor to rising OHS compensation costs.

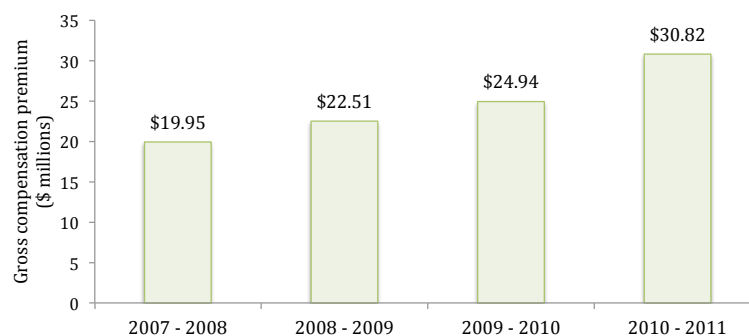


Figure 1: Gross contributions (\$ millions) made by the TSS for workers compensation insurance premiums during the period from 1 July 2007 to 30 June 2011¹

In 2011, the TSS paid almost \$31 million into the Tasmanian Risk Management Fund as a workers compensation premium (Figure 1).. Furthermore, the average cost of stress-related claims (\$30,293) was more than double the cost of all other types of claims (\$13,020)(1).

In the most recent available report on the workers compensation claims profile for the TSS, WorkCover Tasmania suggested that lost days and claims-related costs may be increasing at a faster rate than in other sectors of the Tasmanian workforce (1). In the face of this assessment, it seems particularly important to obtain greater clarity on the demographic features and variables associated with stress-related claims as well as the factors linked to increases and decreases in the cost per case of stress-related claims.

Research questions

Several research questions have been identified in relation to the pattern and direct costs of stress-related WorkCover compensation claims in the TSS over the last 5 years. These will be the focus of further research in the Partnering Healthy@Work project. The research questions include:

¹ Source: Tasmanian Risk Management Fund Annual Reports 2008 – 2011. The figures provided are reported contributions and have not been adjusted for Net Present Value.

1. What is the distribution of stress-related claims compared with claims not related to stress in the TSS by variables including age, gender, government department, occupation, leave days, and mechanism of injury?
2. What is the cost profile for stress-related claims versus not stress-related claims in the TSS?
3. To what extent does this distribution match that observed for self-reported psychological distress in TSS workforce online surveys for the reference years 2010 and 2011?
4. Has the distribution or cost changed over the past 5 years for stress claims versus all other claims?

Purpose of this report

This report answers research question 1. It examines the distribution of stress-related compensation claims versus claims not related to stress by age, sex, government department, occupation, leave days, and mechanism of injury. Information on key occupations of interest to the PSMO is also provided.

Method

This project has received ethics approval from the Tasmanian Social Sciences Health Research Ethics Committee (H12363).

Workers Compensation Definitions and Processes

Compensation is payable under the *Tasmanian Workers Compensation and Rehabilitation Act 1988* (the Act) to a worker who suffers an injury or disease arising out of, or in the course of, the worker's employment. Compensation may cover areas such as lost earnings, medical expenses, rehabilitation expenses, permanent impairment and some common-law damages.

Stress-related claims, which fall under the Act's definition of a 'Mental Disease', are compensable only if work is the major or most significant contributor to the existence of the disease. The Act does not provide for compensation in work situations where stress is related to appropriate management actions such as performance management, deployment, and discipline. Furthermore, although workers must notify their employers of the existence of an injury or disease as soon as practicable, they have 6 months to lodge a formal claim after that notification.

WorkCover Tasmania manages the workers compensation scheme and monitors the performance of organisations operating under the scheme. As such it acts as the custodian of information received about workers compensation claims, which includes details obtained from claim forms and payments made by the insurance schemes to injured workers. The TSS is a scheme participant.

Data source and variables

In May 2012, WorkCover Tasmania extracted all workers compensation claims data 'reported' for the period 1 January 2007 to 31 December 2011, providing de-identified information to the Menzies Research Institute Tasmania (MRIT) investigation team. Reporting of claims is a legislated requirement and indicates the commencement time point for a compensation claim. Claims that commenced prior to 2007 and were ongoing during the 5 subsequent years are not included in the figures presented in this report. Although claims may have commenced in one year, they can continue to accumulate costs and leave days until they are closed, which may take more than 12 months. The WorkCover dataset does not record closure dates.

Our investigation suggested that the data would give greater explanation when represented by financial years so as to coincide with the release of annual TSS employee headcount data and the introduction of new legislation on 1 July 2010.

Data variables available included: type of claim, claim commencement year, age, sex, occupation, organisation, leave days, type of cost, date of payment and mechanism of injury. To aid analysis, workers compensation claims were subsequently categorized into: 'stress-related' and 'not stress-related' claims.

Variable definitions

The stress-related claims reported here are classified as mental diseases under OHS legislation and include the categories: anxiety or stress disorders, depression, anxiety and depression combined, reactions to stressors, unspecified mental diseases, and Post-Traumatic Stress Disorder (PTSD). Short-term shock, which refers to mild (short-term) shock or hyperventilation, is not included in this categorization.

WorkCover Tasmania uses the Australian Standard Classification of Occupations (ASCO) to categorize occupations. Every occupational sub-category was manually reviewed with the aim of creating new themed categories (e.g. emergency services, nurses, teachers) that could be compared to existing TSS industrial award categories, which have previously been clarified with the PSMO. This report shows these newly themed categories and not typical ASCO sub-categories.

Costs are defined as 'everything paid out in a year, regardless of when the claim occurred'. Cost variables included payments to doctors, hospitals, rehabilitation, wages, other medical, miscellaneous, investigation and legal expenses. The costs presented here are net costs, separated from costs able to be reimbursed by other forms of insurance. Costs have not been adjusted for net present value.

Leave days are defined as 'all leave days, regardless of when the claim occurred'.

'Mechanism of injury' refers to Type of Occurrence Classification System (ToOCS 3rd Edition) coding of the claimant's written description of how the injury or disease occurred. For the claims presented here, mechanism of injury was manually coded from claim forms by WorkCover Tasmania. Categories include:

- Exposure to a traumatic event (witnessing a fatal or other accident);
- Exposure to workplace or occupational violence (being a victim of a single event);
- Work pressure (deadlines, responsibilities, restructuring, interpersonal conflict, performance based management);
- Suicide or attempted suicide;
- Workplace harassment and/ or workplace bullying (repetitive assault, harassment, abuse, threats);
- Other harassment (sexual, racial); and
- Other mental stress factors (dietary, deficiency diseases).

WorkCover Tasmania has confirmed that written comments are only categorized into one mechanism of injury category and that claimants do not write more than one cause of injury on the forms. The open-ended response design of the mechanism of

injury question means that content may be open to interpretation by data-entry operators.

Claim rates are calculated from TSS data on age and sex employee headcounts for the financial years between 2007-08 and 2010-11. At the time of writing this report, it was not possible to calculate rates of stress-related claims within occupations due to incomplete information on TSS employee numbers within the Australia Standard Classification of Occupations (ASCO) data held within the administrative database. Rates data are presented for financial years only.

Data analysis and limitations

Proportions were used to present some of the information in this report. This analysis involved counting the number of people submitting workers compensation claims according to a variable of interest (e.g. age, sex). It is a common first step in statistical analysis. Although this approach gives an impression of the magnitude of claims, it becomes more useful when we know how many people are in the whole population who could be submitting a claim. For instance, if a whole population has more women than men, it is helpful to determine the rate of claims by sex. These rates are calculated by dividing the number of claims by the total number of people in the corresponding population at the time (e.g. x cases per 1000 employees). Therefore, the reported age and sex data has been supplemented with some rate-based information on age and sex profiles.

Furthermore, the claims data presented here do not include tests of statistical significance. Therefore, although the graphs and tables presented in this report may give a visual impression of trends, this information has yet to be analysed at greater depth and this analysis will occur during the next stage of research.

Caution is recommended when interpreting cost, expense and leave-day results for the 2010-11 financial year because the data are likely to be incomplete due to the ongoing nature of many compensation claims. In consultation with WorkCover, the authors established an estimated 'closed date' by identifying claims that had not recorded a new expense within 6 months. When the authors applied this calculation to the 2010-2011 financial year, it was estimated that 77% (1089/1411) non-stress-related claims and (89%) 171/193 of stress-related claims were potentially open as at 30 December 2011, which was the last available date for data capture in this study.

Results

Summary of workers compensation claims by TSS employees

The annual numbers of new workers compensation claims by Tasmanian State Service employees each year from 1 July 2007 to 30 June 2011 are shown in Figure 1 classified by whether or not the claims were made for stress-related mechanisms. They ranged from 1,461 (12.1% stress-related) in 2009-10 to 1,604 (12.0% stress-related) in 2010-11. Serious claims are a proportion of all claims and represent those claims that had 5 or more days of sick leave. Serious stress-related claims ranged from 71.0% (137/193) of all stress claims in 2010-11 to 82.1% (156/190) in 2008-09. Serious claims not related to stress ranged from 30.8% (434/1411) in 2010-11 to 33.1%(442/1337) in 2008-09.

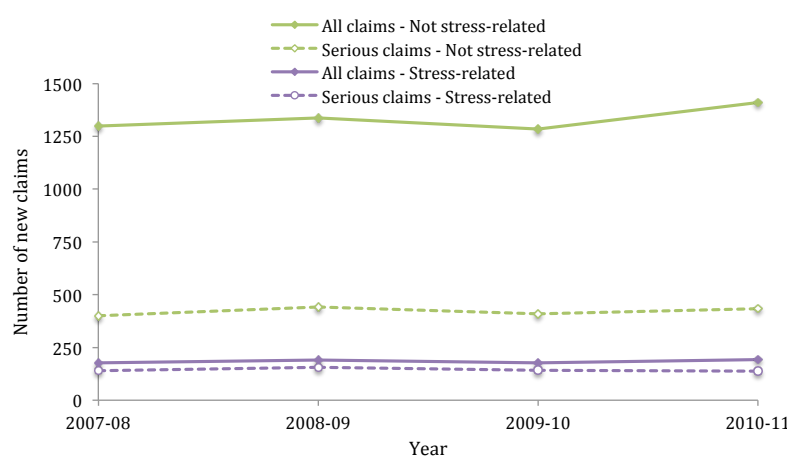


Figure 1: Number of new workers compensation claims during the period from 1 July 2007 to 30 June 2011

The percentage of total claims made by women ranged from 58.2% (934/1604) in 2010-11 to 63.3% (967/1527) in 2008-09. For men, the percentage of total claims ranged from 36.7% (560/1527) in 2008-09 to 41.8% (670/1604) in 2010-11.

Figure 2 shows the number of claims by males and females by the type of claim made (whether or not they were stress-related). The percentage of claims that were stress-related in women ranged from 12.3% (115/934) in 2010-11 to 14.3% (128/892) in 2009-10. In men, the percentage of claims that were stress-related ranged from 8.6% (49/569) in 2009-10 to 11.6% (78/670) in 2010-11.



Figure 2. Number of new stress-related claims and not stress-related claims by sex during the period from 1 July 2007 to 30 June 2011

The total number of workers compensation claims by sex per 1000 employees is presented in Figure 3. The number of stress-related claims per 1000 women ranged from 2.91 in 2010-11 to 6.5 in 2007-08 (Table 1). For men in the TSS, the total number of stress-related claims ranged from 5.03 per 1000 employees (2010-11) to 6.5 per 1000 employees (2007-08).

Table 1. Total number of workers compensation claims by sex per 1000 headcount employees during the financial periods 1 July 2007 to 30 June 2011

Year	Stress-related		Not stress-related	
	Men	Women	Men	Women
2007-08	6.07	6.50	54.62	38.37
2008-09	6.21	5.48	52.69	37.49
2009-10	7.17	6.38	63.34	40.52
2010-11	5.03	2.91	42.05	24.34

The total number of new stress-related claims by age group is presented in Figure 3. During the period from 1 July 2007 to 30 June 2011, the proportions of claims that were stress-related by age ranged from 1.2% (9/737) in the 16 to 24 year category to 44.6% (329/737) in the 45 to 54 year category.

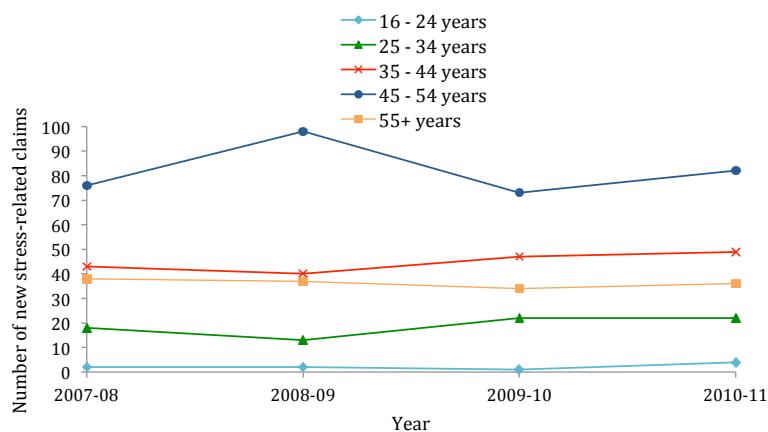


Figure 3. Number of new stress-related claims by age during the period from 1 July 2007 to 30 June 2011

The total number of claims not related to stress is shown by age in Figure 4. The total proportion of claims not related to stress for the period 1 July 2007 to 30 June 2011 represented by age ranged from 5% (265/5330) in the 16 to 24 year category to 36.3% (1936/5330) in the 45 to 54 year category.

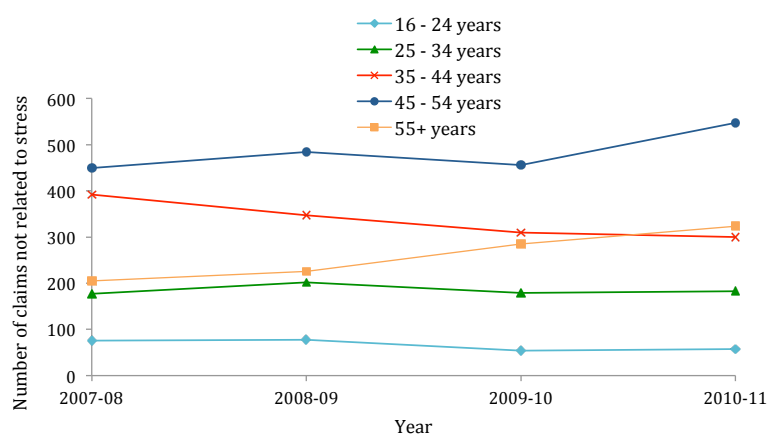


Figure 4. Number of new claims not related to stress by age during the period from 1 July 2007 to 30 June 2011

The total number of new stress-related workers compensation claims by age-group per 1000 headcount TSS employees is shown in Table 2. In the 2010-11 year, the rate of stress-related claims per 1000 employees decreased markedly across all age categories from that of the previous financial year. The highest rate for stress-related claims in 2010-2011 was 4.35 claims per 1000 headcount within the 35-44 years age category.

Table 2. Number of stress-related workers compensation claims by age-group per 1000 headcount employees during period from 1 July 2007 to 30 June 2011

	16-24 years	25-34 years	35-44 years	45-54 years	55+ years
2007 - 2008	2.37	3.14	4.96	8.61	7.62
2008 - 2009	0.80	3.44	6.16	7.07	5.53
2009 - 2010	4.13	4.79	6.85	8.30	5.49
2010 - 2011	0.83	1.99	4.35	3.92	3.32

Decreases were also apparent across all age categories for claims not related to stress per 1000 employees between the 2009-10 and 2010-11 financial years (Table 3). The highest rate of claims unrelated to stress was 34.24 claims per 1000 headcount employees in the 45-54 years age-category.

Table 3. Number of non-stress-related workers compensation claims by age-group per 1000 headcount employees during the period from 1 July 2007 to 30 June 2011

	<i>16-24 years</i>	<i>25-34 years</i>	<i>35-44 years</i>	<i>45-54 years</i>	<i>55+ years</i>
2007 - 2008	48.93	39.15	49.84	42.42	39.11
2008 - 2009	58.31	39.70	44.46	41.49	39.20
2009 - 2010	51.98	39.10	43.85	52.06	49.37
2010 - 2011	32.61	25.33	26.01	34.24	29.75

The estimated duration of compensation claims between 1 July 2007 and 30 June 2011 is shown in Figure 5. Duration represents the period between the first and last day of payments in relation to a compensation claim. Based on the average duration of 446 days per claim for the 3 years to 30 June 2010, the number of days in 2010-11 seems likely to be an underestimation of the days-per-claim due to ongoing claims. Claims unrelated to stress averaged 235 days per claim for the 3 years to 30 June 2010.



Figure 5: Average duration of workers compensation claims for claims commencing during the period from 1 July 2007 to 30 June 2011

For those claims commencing on or after 1 July 2007, Figure 6 shows the average leave days taken per claim for each financial year to 30 June 2011. Readers should note that the leave-day results for the 2010-11 financial year are incomplete due to a number of ongoing compensation claims.

Average leave days taken for stress-related claims ranged from 51 days in 2010-11 to 97 days in 2007-08. Claims not related to stress ranged from an average of 12 leave days in 2010-11 to 29 days in 2007-08. On average, stress-related claims accounted for 81% (321/394) of all compensation-related leave days in the 4 year period.

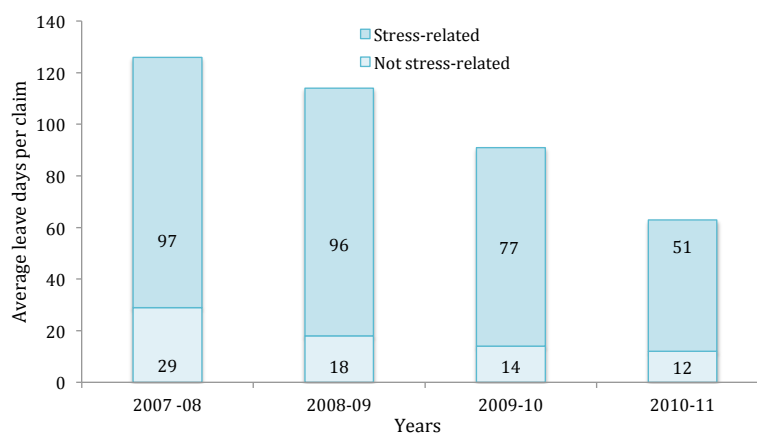


Figure 6: Average leave days for workers compensation claims for claims commencing during the period from 1 July 2007 to 30 June 2011

The average cost (i.e. derived from the sum of all costs and expenses) of stress-related claims has been typically at least 3-fold that of the cost of non-stress-related claims during the period 1 July 2007 to 30 June 2011 (Figure 7).

The proportion of total workers compensation costs allocated to stress-related claims ranged from 75.2% (\$28,468/\$37,848) in 2007-08 to 82.1% (\$27,520/\$33,526) in 2009-10. As was highlighted by Figure 6, many stress-related claims submitted in the 2010-11 year were likely to have been ongoing as at 30 June 2011. Thus the costs for the most recently reported year probably underestimate the average cost per stress-related claim. This observation is also important when examining Table 4.

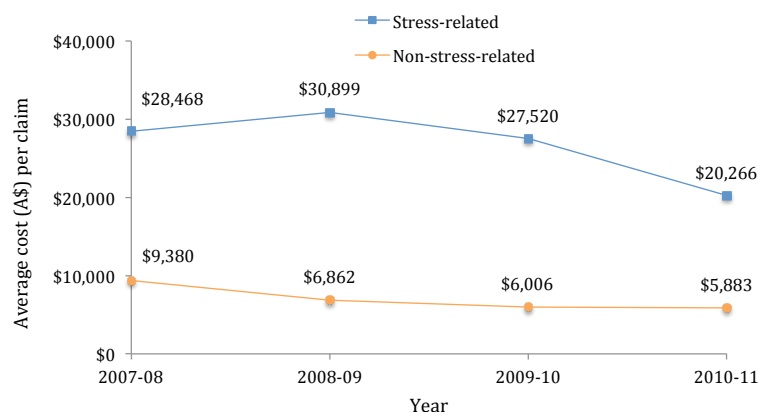


Figure 7: Average cost (A\$) for workers compensation claims commencing during the period from 1 July 2007 to 30 June 2011

Table 4 shows the distribution of costs for claims by year, highlighting that stress-related claims typically have a higher average expense cost. Costs reported in Table 4 are net expenses, separate from costs that can be reimbursed through other types of insurance coverage (e.g. third party motor vehicle insurance).

Table 4. Average expenses (A\$) for workers compensation claims commencing during the period from 1 July 2007 to 30 June 2011

	2007-08	2008-09	2009-10	2010-11
	\$	\$	\$	\$
Doctor				
Stress-related	2803	2619	2621	2044
Not stress-related	1190	935	850	922
Hospital				
Stress-related	191	276	222	129
Not stress-related	449	479	416	439
Rehabilitation				
Stress-related	4540	4993	5730	4387
Not stress-related	1517	1122	1087	1092
Other medical				
Stress-related	224	259	114	107
Not stress-related	903	785	720	671
Travel/ Accommodation				
Stress-related	184	329	280	158
Not stress-related	186	122	97	95
Weekly wages				
Stress-related	19872	21506	17972	13045
Not stress-related	4951	3350	2791	2650
Legal expenses				
Stress-related	744	916	581	396
Not stress-related	184	70	45	13
Investigation expenses				
Stress-related	1490	2157	2127	1891
Not stress-related	518	382	342	274

During the four year period from 1 July 2007 to 30 June 2011 the top four agencies contributing the most workers compensation claims shown in Figure 8 were: the Department of Health and Human Services, which had 341/2503 (13.6%) stress-related claims; the Department of Education, which had 247/1998 (12.4%) stress related claims; the Department of Police and Emergency Management, which had 19/575 (3%) stress-related claims; and the Department of Justice, which had 45/240 (18.8%) stress-related claims.

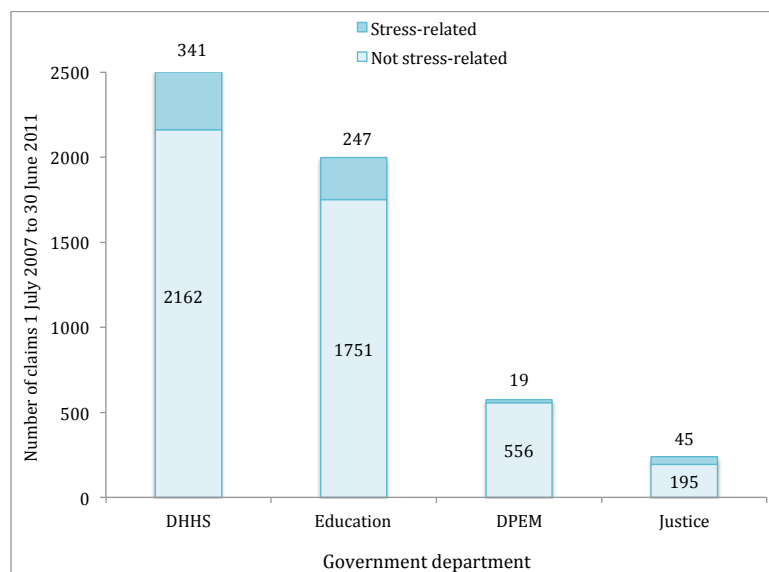


Figure 8. The four government departments contributing the highest number of workers compensation claims during the period from 1 July 2007 to 30 June 2011

When government department claim rates were calculated for stress-related claims, they ranged from a low of 2.0 claims per 1000 employees for the collection of agencies currently identified as the Department of Primary Industries and Water (DPIWE) and Department of Economic Development and Tourism (DEDTA) to a high of 12.6 claims per 1000 employees for organisations grouped in Table 4 as Tasmanian Academy, Tasmanian Polytechnic and Tasmanian Skills Institute during the 4 year period examined.

Table 4. Number of stress-related workers compensation claims by government department* per 1000 headcount employees during the period from 1 July 2007 to 30 June 2011

<i>Department</i>	<i>2007-08</i>	<i>2008-09</i>	<i>2009-10</i>	<i>2010-11</i>	<i>Ave.</i>
Health and Human Services	8.9	8.2	6.5	7.0	7.6
Infrastructure, Energy & Resources	1.5	3.1	5.2	8.5	4.5
DPIWE/ DEDTA	1.3	1.7	2.0	2.9	2.0
Police and Emergency Management	5.3	4.3	3.4	7.9	5.2
Premier and Cabinet	5.1	2.5	8.6	0.0	4.1
Treasury and Finance	0.0	0.0	0.0	9.6	2.3
Education	5.4	6.2	6.2	5.6	5.8
Justice	6.3	8.9	8.3	16.9	10.1
Pt Arthur Historic Site Mgmt Auth	0.0	0.0	9.2	0.0	2.2
Tas Academy/ Polytechnic/ Skills Institute	3.2	7.4	18.1	39.5	12.6

* Government departments shown represent amalgamations of older agencies (see Appendix: Table A6 for details). The Tasmanian Audit Office, Tasmanian Public Trustee and Integrity Commission of Tasmania are excluded as no claims were made during this period.

Claims not related to stress ranged from 16.7 per 1000 employees for the Department of Treasury and Finance to 152.2 for the Department of Police and Emergency Management during the period 1 July 2007 to 30 June 2011 (Table 5).

Table 5. Number of non-stress-related workers compensation claims by government department per 1000 headcount employees during the period from 1 July 2007 to 30 June 2011

<i>Department</i>	<i>2007-08</i>	<i>2008-09</i>	<i>2009-10</i>	<i>2010-11</i>	<i>Ave.</i>
Health and Human Services	51.1	45.3	47.4	50.5	48.5
Infrastructure, Energy & Resources	23.1	39.2	22.3	27.1	28.1
DPIWE/ DEDTA	35.8	37.4	36.8	37.5	36.9
Police and Emergency Mgmt	164.6	173.9	139.2	129.4	152.2
Premier and Cabinet	28.1	17.6	25.7	21.2	23.1
Treasury and Finance	27.0	8.8	21.1	9.6	16.7
Education	35.8	40.4	44.3	44.4	41.2
Justice	37.9	39.0	38.0	60.4	43.9
Pt Arthur Historic Site Mgmt Auth	95.7	66.7	73.4	62.5	74.6
Tas Academy/ Polytechnic/ Skills Institute	23.4	25.0	15.1	97.4	26.1

The total numbers of stress-related workers compensation claims by occupation during the period from 1 June 2007 to 30 June 2011 is shown in Figure 9. Several occupations had a comparatively higher volume of stress-related claims during this period. For stress-related claims by occupation, nurses represented 25.6% (189/737) of all claims; intermediate community and care workers represented 23.1% (170/737) of all claims; teachers represented 10.3% (76/737) of all claims; and intermediate white-collar workers represented 9.5% (70/737) of all claims. Information on TSS employee occupation classification codes was not available so relative rates of claims across occupations were not calculated.



Figure 9. Total number of stress-related compensation claims per annum by occupation during the period from 1 July 2007 to 30 June 2011

As a comparison with Figure 9, Figure 10 shows the claims not related to stress by occupation for the period from 1 July 2007 to 30 June 2011. In order of volume, intermediate community and care workers contributed the highest proportion with 18.7% (999/5331) of all claims; elementary blue collar workers contributed 16.7% (892/5331) of all claims; teachers contributed 15.6% (830/5331) of all claims; emergency service workers contributed 13.2% (703/5331) of all claims; and nurses contributed 11.4% (610/5331) of all claims during the period assessed.

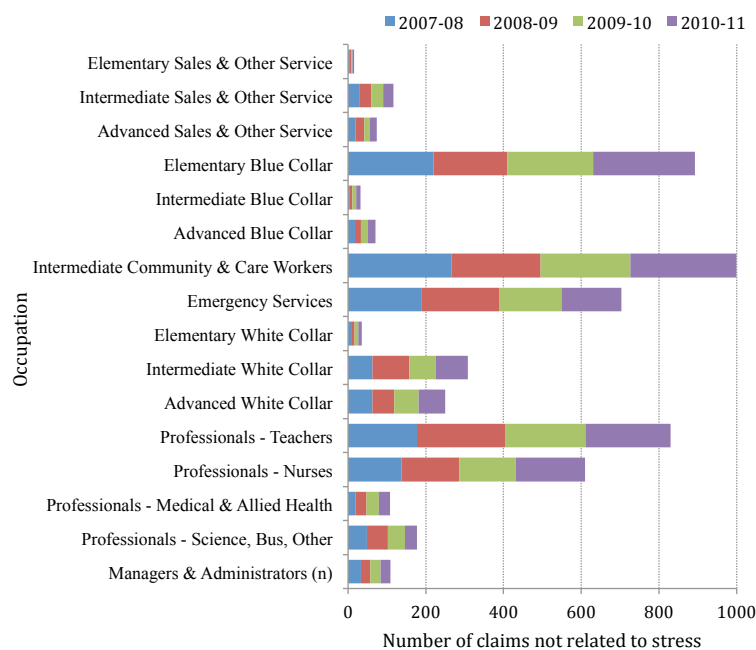


Figure 10. Total number of compensation claims not related to stress per annum by occupation during the period from 1 July 2007 to 30 June 2011

'Mechanisms of injury' represent the claimants' perception of the workplace circumstances that led to an injury or disease and thus the submission of a workers compensation claim. The categories typically cited within stress-related claims are shown in Figure 11, which provides the total number of claims by mechanism of injury for the period 1 July 2007 to 30 June 2011.

Work pressure was the most common type of mechanism of injury cited across all financial years, accounting for 59% (435/737) of all stress-related claims. It is a general classification name for a range of factors including: work backlogs, deadlines, responsibilities and organisational restructuring; interpersonal conflict with peers and supervisors; performance counseling, job disciplinary action and job promotion disappointment.

Workplace harassment or bullying contributed 16.4% (121/737) of all stress-related claims. It describes victimization via repeated threats and/ or assault, verbal harassment or abuse from a work colleague or colleagues.

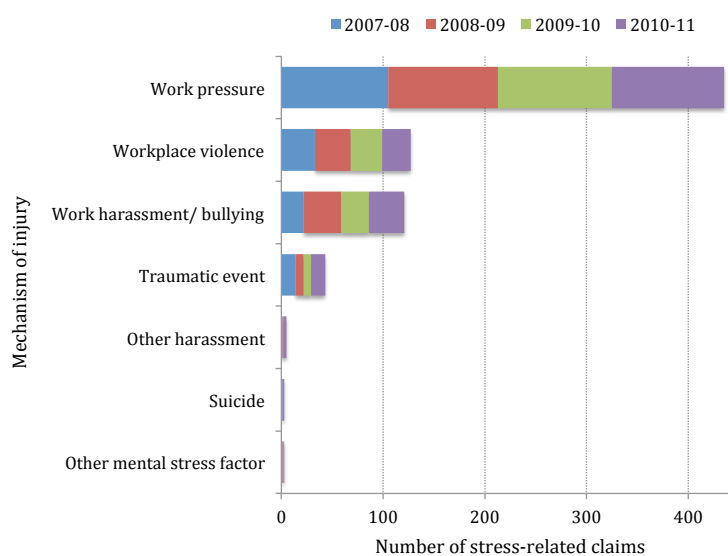


Figure 11. Total number of stress-related compensation claims per annum by mechanism of injury during the period from 1 July 2007 to 30 June 2011

The top-ranked mechanisms of injury were combined with the four occupations with the highest number of stress-related compensation claims in Figure 12. Work pressure was the most commonly cited mechanism of injury across all four occupations, accounting for 60.1% (292/486) of all claims in this grouping. Workplace violence claims were also common for intermediate (Int) community and care workers and teachers.

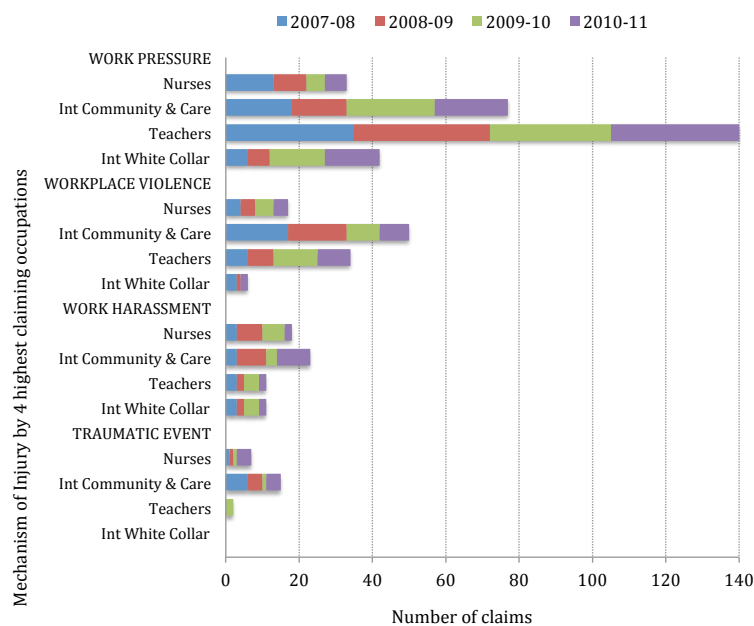


Figure 12. Number of stress-related compensation claims by top four mechanisms of injury and occupation during the period from 1 July 2007 to 30 June 2011

Summary of results

- The total number of new workers compensation claims in the TSS during the 1 July 2007 to 30 June 2011 period ranged from 1,461 (12.1% stress-related) in 2009-10 to 1,604 (12.0% stress-related) in 2010-11. WorkCover Tasmania data showed that the proportion of stress-related workers compensation claims, relative to all claims submitted appeared relatively constant during this period.
- Nearly two-thirds of the TSS workforce was female. The percentage of total claims made by women ranged from 58.2% (934/1604) in 2010-11 to 63.3% (967/1527) in 2008-09. The number of stress-related claims per 1000 women ranged from 2.91 in 2010-11 to 6.5 in 2007-08 (Table 1). For men in the TSS, the total number of stress-related claims ranged from 5.03 per 1000 employees (2010-11) to 6.5 per 1000 employees (2007-08).
- During the period from 1 July 2007 to 30 June 2011, the proportions of stress-related claims by age ranged from 1.2% (9/737) in the 16 to 24 year category to 44.6% (329/737) in the 45 to 54 year category. In the 2010-11 year, the rate of stress-related claims per 1000 employees decreased markedly across all age categories from that of the previous financial year. The highest rate for stress-related claims in 2010-2011 was 4.35 claims per 1000 headcount within the 35-44 years age category.
- As compensation claim processes can take more than 12 months to resolve, average costs, expenses and leave-days reported for the 2010-11 financial year are incomplete in this report.
- Average leave days taken for stress-related claims ranged from 51 days in 2010-11 to 97 days in 2007-08. Claims not related to stress ranged from 12 days in 2010-11 to 29 days in 2007-08. On average, stress-related claims accounted for 81% (321/394) of all compensation-related leave days in the 4 year period.
- The average cost (i.e. sum of all costs and expenses) of stress-related claims has been between typically at least 3-fold that of the cost of all other types of claims during the period 1 July 2007 to 30 June 2011 (Figure 7). The proportion of total workers compensation costs allocated to stress-related claims ranged from 75.2% (\$28,468/\$37,848) in 2007-08 to 82.1% (\$27,520/\$33,526) in 2009-10.
- During the four year period from 1 July 2007 to 30 June 2011 the top four agencies contributing workers compensation claims were: the Department of Health and Human Services, which had 341/2503 (13.6%) stress-related claims; the Department of Education, which had 247/1998 (12.4%) stress related claims; the Department of Police and Emergency Management which had 19/575 (3%) stress-related claims; and the Department of Justice, which had 45/240 (18.8%) stress-related claims.
- When government department claim rates were calculated for stress-related claims, they ranged from a low of 2.0 claims per 1000 employees for the collection of agencies currently identified as the Department of Primary

Industries and Water (DPIWE) and Department of Economic Development and Tourism (DEDTA) to a high of 12.6 claims per 1000 employees for organisations grouped in Table 4 as Tasmanian Academy, Tasmanian Polytechnic and Tasmanian Skills Institute during the 4 year period examined.

- Occupations were derived from Australian Standard Classification of Occupations (ASCO) sub-categories in the WorkCover dataset. For stress-related claims by occupational group, nurses represented 25.6% (189/737) of all claims; intermediate community and care workers represented 23.1% (170/737) of all claims; teachers represented 10.3% (76/737) of all claims; and intermediate white-collar workers represented 9.5% (70/737) of all claims. Claim rates were unavailable by occupation group.
- Work pressure was the most common type of mechanism of injury cited across all financial years, accounting for 59% (435/737) of all stress-related claims. It is a general classification name for a range of factors including: work backlogs, deadlines, responsibilities and organisational restructuring; interpersonal conflict with peers and supervisors; performance counseling, job disciplinary action and job promotion disappointment. Workplace harassment or bullying contributed 16.4% (121/737) all stress-related claims. It describes victimization via repeated threats and/ or assault, verbal harassment or abuse from a work colleague or colleagues.

Limitations

This report is intended as a description of the available data. Therefore it does not provide deeper level analysis of the suggested trends and potential associations contained in this report. Further analysis is needed to inform research and policy directions.

Furthermore, the WorkCover data are reliant upon data drawn from claim forms that are based upon claimants' perceptions at the time of their claim's submission. The database does not provide information about claim outcomes or details of psychosocial hazards accepted by employers or proven through investigation processes to have been associated with claims of injury or disease.

Recommendations

It is recommended that:

- Further analysis of the data is conducted to examine whether TSS employees submitting stress-related claims:
 - Have unique features (i.e. age, sex, occupation, agency, expenses, leave days or financial year) when compared with non-stress related claims;

- Have had similar volumes of claims over time; when examined by age, sex, occupation and agency; and
 - Are similar in their demographic patterns of age, sex, occupation and agency to who employees reported high psychological distress in the 2010 partnering Healthy@Work survey.
- Claims-based data held by WorkCover or relevant insurers are extracted for the TSS on a yearly basis to monitor changes in performance over time, especially in regard to the effectiveness of legislation. Data extraction should be timed to ensure the costs, expenses and leave-days data are as complete as possible so that accurate comparisons can be made between years.
- When occupations information becomes available on the administrative database, these data are extracted to assess rates of claims by occupational group.
- A detailed file review be conducted across the four occupational groups with the highest number of stress-related claims to audit claims processes and identify the psychosocial hazards associated with these claims. This file review should include an examination of claimant descriptions of how injuries or diseases occurred to verify the accuracy of ToOCs coding.

References

1. **Workcover. Tasmanian State Service Workplace Injuries Statistical Report 2008. Hobart, Tasmania; 2009.**
2. **Workcover. Progress against the National OHS Strategy. 2011.**

Appendix 1: Tables

Table A1: Number of new workers compensation claims during the period from 1 July 2007 to 30 June 2011

	Not stress-related		Stress-related	
	<i>All claims</i>	<i>Serious claims</i>	<i>All claims</i>	<i>Serious claims</i>
2007-08	1299	400	177	139
2008-09	1337	442	190	156
2009-10	1284	410	177	141
2010-11	1411	434	193	137

Table A2: Number of new stress-related claims and not stress-related claims by sex during the period from 1 July 2007 to 30 June 2011

	Not stress-related		Stress-related	
	<i>Women</i>	<i>Men</i>	<i>Women</i>	<i>Men</i>
2007-08	777	522	115	62
2008-09	840	497	127	63
2009-10	764	520	128	49
2010-11	819	592	115	78

Table A3: Number of new stress-related claims by age during the period from 1 July 2007 to 30 June 2011

	<i>16 - 24 years</i>	<i>25 - 34 years</i>	<i>35 - 44 years</i>	<i>45 - 54 years</i>	<i>55+ years</i>
2007-08	2	18	43	76	38
2008-09	2	13	40	98	37
2009-10	1	22	47	73	34
2010-11	4	22	49	82	36

Table A3: Number of new claims not related to stress by age during the period from 1 July 2007 to 30 June 2011

	<i>16 - 24 years</i>	<i>25 - 34 years</i>	<i>35 - 44 years</i>	<i>45 - 54 years</i>	<i>55+ years</i>
2007-08	76	177	392	449	205
2008-09	78	202	347	484	226
2009-10	54	179	310	456	285
2010-11	57	183	300	547	323

Table A4: Number of new stress-related claims by government department during the period from 1 July 2007 to 30 June 2011

<i>Government Department</i>	<i>2007-08</i>	<i>2008-09</i>	<i>2009-10</i>	<i>2010-2011</i>	<i>Total</i>
DCHS	0	0	0	0	0
DECCD	0	3	0	3	6
DED	0	0	1	1	2
DEDTA	0	0	0	1	1
DHHS	94	94	73	80	341
DIER	1	2	3	5	11
DPAC	2	1	3	0	6
DPIPWE	1	0	1	0	2
DPIWE	0	3	2	4	9
DPEM	5	4	3	7	19
DTF	0	0	0	0	0
DTPHA	2	1	0	0	3
Education	61	63	62	61	247
Justice	7	10	9	19	45
RBF	0	1	0	1	2
PAHSMA	0	0	1	0	1
TAFE/ Tas Academy/ Tas Skills Institute	4	2	2	1	9
Tas Polytechnic	0	6	17	7	30
Treasury	0	0	0	3	3

Table A5: Number of new claims not related to stress by government department during the period from 1 July 2007 to 30 June 2011

<i>Government Department</i>	<i>2007-08</i>	<i>2008-09</i>	<i>2009-10</i>	<i>2010-2011</i>	<i>Total</i>
DCHS	0	1	0	1	2
DECCD	0	22	0	7	29
DED	9	8	3	2	22
DEDTA	0	0	1	1	2
DHHS	537	521	531	573	2162
DIER	15	25	13	16	69
DPAC	11	7	9	7	34
DPIPWE	1	4	39	37	81
DPIWE	32	40	26	35	133
DPEM	156	161	124	115	556
DTF	2	0	0	0	2
DTPHA	42	35	4	2	83
Education	402	408	445	496	1751
Justice	42	44	41	68	195
RBF	11	8	8	7	34
PAHSMA	3	2	3	0	8
TAFE/Tas Academy/ Tas Skills Institute	29	27	4	13	73
Tas Polytechnic	0	20	26	24	70
Treasury	7	3	7	3	20

Table A6: Consolidated* new stress-related claims by government department during the period from 1 July 2007 to 30 June 2011

<i>Department</i>	<i>2007-08</i>	<i>2008-09</i>	<i>2009-10</i>	<i>2010-2011</i>	<i>Total</i>
Health and Human Services	94	94	73	80	341
Infrastructure, Energy & Resources	1	2	3	5	11
DPIWE/ DEDTA	3	4	4	6	17
Police and Emergency Mgmt	5	4	3	7	19
Premier and Cabinet	2	1	3	0	6
Treasury and Finance	0	0	0	3	3
Education	61	66	62	64	253
Justice	7	10	9	19	45
Pt Arthur Historic Site Mgmt Auth	0	0	1	0	1
Tas Academy/ Polytechnic/ Skills Institute	4	14	36	15	69
Tas Audit Office	0	0	0	0	0
The Public Trustee	0	0	0	0	0
Integrity Commission of Tasmania	0	0	0	0	0

* Due to changes in government departments during this period, agencies have been consolidated into names given to current organisations so that department claim rates could be calculated. The Retirement Benefit Fund (RBF) was excluded. DPIPWE/DEDTA also represents DTPHA, DEDTA and DED. Education also represents DECCD. DHHS also represents DCHS. Tasmanian Academy, Tasmanian Skills Institute and Tasmanian Polytechnic also include TAFE.

Table A7: Consolidated claims not related to stress by government department during the period from 1 July 2007 to 30 June 2011

<i>Government Department</i>	<i>2007-08</i>	<i>2008-09</i>	<i>2009-10</i>	<i>2010-2011</i>	<i>Total</i>
Health and Human Services	537	522	531	574	2164
Infrastructure, Energy & Resources	15	25	13	16	69
DPIWE/ DEDTA	84	87	73	77	321
Police and Emergency Mgmt	156	161	124	115	556
Premier and Cabinet	11	7	9	7	34
Treasury and Finance	9	3	7	3	22
Education	402	430	445	503	1780
Justice	42	44	41	68	195
Pt Arthur Historic Site Mgmt Auth	11	8	8	7	34
Tas Academy/ Polytechnic/ Skills Institute	29	47	30	37	143
Tas Audit Office	0	0	0	0	0
The Public Trustee	0	0	0	0	0
Integrity Commission of Tasmania	0	0	0	0	0

Table A8: Number of new stress-related claims by occupation during the period from 1 July 2007 to 30 June 2011

<i>Occupation</i>	<i>2007-08</i>	<i>2008-09</i>	<i>2009-10</i>	<i>2010-2011</i>	<i>Total</i>
Managers & Administrators	4	9	5	5	23
Professionals - Science, Bus, Other	2	8	6	9	25
Professionals - Medical & A/Health	4	5	4	4	17
Professionals - Nurses	22	21	17	16	76
Professionals - Teachers	44	46	51	48	189
Advanced White Collar	14	13	7	17	51
Int White Collar	12	11	21	26	70
Elementary White Collar	2	1	3	5	11
Emergency Services	7	12	6	10	35
Int Community & Care Workers	46	45	37	42	170
Advanced Blue Collar	2	0	2	0	4
Int Blue Collar	3	1	1	0	5
Elementary Blue Collar	9	7	11	7	34
Advanced Sales & Other Service	3	5	2	2	12
Int Sales & Other Service	3	5	3	2	13
Elementary Sales & Other Service	0	1	1	0	2

Table A9: Number of new claims not related to stress by occupation during the period from 1 July 2007 to 30 June 2011

<i>Occupation</i>	<i>2007-08</i>	<i>2008-09</i>	<i>2009-10</i>	<i>2010-2011</i>	<i>Total</i>
Managers & Administrators	33	24	27	25	109
Professionals - Science, Bus, Other	49	53	44	31	177
Professionals - Medical & A/Health	19	28	32	29	108
Professionals - Nurses	138	148	145	179	610
Professionals - Teachers	177	227	207	219	830
Advanced White Collar	63	56	63	68	250
Int White Collar	63	94	69	82	308
Elementary White Collar	8	9	9	9	35
Emergency Services	188	200	161	154	703
Int Community & Care Workers	266	229	231	273	999
Advanced Blue Collar	18	15	18	20	71
Int Blue Collar	5	6	10	11	32
Elementary Blue Collar	220	190	221	261	892
Advanced Sales & Other Service	19	23	14	18	74
Int Sales & Other Service	29	31	30	27	117
Elementary Sales & Other Service	4	4	3	5	16

Table A10: Number of stress-related claims by mechanism of injury during the period from 1 July 2007 to 30 June 2011

<i>Mechanism of Injury</i>	<i>2007-08</i>	<i>2008-09</i>	<i>2009-10</i>	<i>2010-2011</i>	<i>Total</i>
Other mental stress factor	1	1	0	1	3
Suicide	1	0	0	2	3
Other harassment	1	1	0	3	5
Traumatic event	14	8	7	14	43
Work harassment/ bullying	22	37	27	35	121
Workplace violence	33	35	31	28	127
Work pressure	105	108	112	110	435

Table A11: Number of stress-related compensation claims by top four mechanisms of injury and occupation during the period from 1 July 2007 to 30 June 2011

<i>Mechanism of injury & Occupation</i>	<i>2007-08</i>	<i>2008-09</i>	<i>2009-10</i>	<i>2010-2011</i>	<i>Total</i>
Traumatic Event					
Int White Collar	0	0	0	0	0
Teachers	0	0	2	0	2
Int Community & Care	6	4	1	4	15
Nurses	1	1	1	4	7
Work Harassment					
Int White Collar	3	1	0	2	6
Teachers	6	7	12	9	34
Int Community & Care	17	16	9	8	50
Nurses	4	4	5	4	17
Workplace Violence					
Int White Collar	6	6	15	15	42
Teachers	35	37	33	35	140
Int Community & Care	18	15	24	20	77
Nurses	13	9	5	6	33
Work Pressure					
Int White Collar	6	6	15	15	42
Teachers	35	37	33	35	140
Int Community & Care	18	15	24	20	77
Nurses	13	9	5	6	33

Table A12: Headcount* by government department during the period from 1 July 2007 to 30 June 2011

<i>Government Department</i>	<i>2007-08</i>	<i>2008-09</i>	<i>2009-10</i>	<i>2010-2011</i>	<i>Total</i>
Health and Human Services	10507	11524	11199	11377	44607
Infrastructure, Energy & Resources	648	638	582	590	2458
DPIWE/ DEDTA	2346	2328	1984	2051	8709
Police and Emergency Mgmt	948	926	891	889	3654
Premier and Cabinet	392	398	350	330	1470
Treasury and Finance	333	339	331	313	1316
Education	11235	10634	10053	11331	43253
Justice	1107	1129	1078	1125	4439
Pt Arthur Historic Site Mgmt Auth	115	120	109	112	456
Tas Academy/ Polytechnic/ Skills Institute	1238	1880	1989	380	5487
Tas Audit Office	39	38	43	42	162
The Public Trustee	52	54	54	51	211
Integrity Commission of Tasmania	0	0	1	15	16

* Headcount data sourced from the Office of the State Service Commissioner Annual Reports. Paid headcount data used during the period 1 July 2009 to 30 June 2011.

Appendix D: What can regulatory data on stress claims really tell us?

Jarman L, Martin A, Venn A, Ogle, F, and Sanderson K. – What does regulatory data on stress claims really tell us? Submitted to Australian Journal of Public Administration on 20 April 2015. Currently under review.

This article provides a commentary of themes arising from the workers compensation study reported in Chapter 4. This case history tells the story of our experience working with claims data extracted from WorkCover Tasmania; how we went about it, the problems we found, and the lessons we learned. Whilst analysis of centralised data on work related psychological injury (stress related) claims plays a critical role in employment regulation and policy development, we identified major weaknesses in data capture that impede its usefulness for employers, researchers and policy-makers. We make recommendations about how these issues can be addressed.

Introduction

Workers' compensation systems focus upon individual health and safety and are key mechanisms for the protection of worker health (1). Claims for stress-related compensation (stress claims) have relatively high costs and can be difficult to resolve (2,3). These types of claims have negative consequences for both employers, due to lost productivity and rising compensation premiums (3) and employees, who have been found to experience worse mental health as a result of the claims process (4). Employees who have made these types of claims are also less likely to return to work at the conclusion of claims processes (5) resulting in an increased burden on society through welfare and disability service use. Tasmania has historically been cited as lagging behind national benchmarks for stress-related work, health and safety (WHS) indicators (6). In a recent study (7) we drew upon regulatory data to report on trends, costs and causes of stress claims in the Tasmanian Government.

Australia has one of the most advanced compensation systems in the world (8). The National Dataset for Compensation-based Statistics (NDS) represents the only annual form of population-level data collection on the mental health of Australian workers and its association with psychosocial hazards (9). Data from regulatory authorities in each Australian state and territory are forwarded annually to the NDS using a standard format. These data have generated a solid body of research over time [e.g. (10-13)]. One of the purposes of these data is to “help in the identification of the nature and causes of the problems and enable research, resources and risk reduction strategies to be better targeted” (p.4) (14). As such the NDS forms the primary dataset for reference in the development of national policy on occupational health and safety (OHS). Compensation claim data are captured that include each claimant’s age, sex, occupation, type of injury, mechanism (cause) of injury, injury leave days and claim costs. This case study describes the challenges we encountered when conducting research using state-based regulatory data and discusses lessons learned. We have written this article to help others considering similar forms of research, and to promote discussion among policy makers about the data currently collected on stress claims in Australia.

Method

Setting

Workers compensation is a legislated requirement for all Australian employers, operating under a ‘no fault’ system (8) and Tasmania has its own state-based regulatory authority, WorkCover Tasmania. Claims can be lodged by employees who have a medically certified injury or illness substantially contributed by the work environment (15). Stress claims were defined by compensation claims relating to mental disease. Ethics approval for the study was obtained from the Human Health and Research Ethics Committee (Tasmania) Network (ID: H0012363).

Design

The method for the data extraction and analysis of stress claims has been described in detail elsewhere (7). To summarise, with the assistance of WorkCover Tasmania, we extracted 4 years of workers' compensation data (2007-2011) pertaining to the Tasmanian Government workforce and compared trends in numbers, costs and features of stress and non-stress claims.

To frame the stress claims data in their operational and legal context, and to verify the nature of the data extracted, we also conducted:

- i) a documentation review of Australian work health and safety websites, legislation, regulations, SafeWork publications, compensation claim forms, and the Type of Occurrence Classification Scheme (ToOCs [3rd edition]) categories for mental diseases;
- ii) a critical assessment of the content of WorkCover Tasmania database; and
- iii) a narrative literature review of work factors contributing to job stress.

This contextual information was collected on an ongoing basis from March 2012 to November 2014 as analysis of our data proceeded and themes from this conceptual review emerged.

Results and Discussion

In this section we first give a brief overview of research on occupational mental disease and then present the 3 themes we derived from the conceptual review. These themes, namely legislation coverage in Australia, psychosocial hazard identification and obligations under the WHS Act are discussed along with their implications.

Causes of occupational mental disease

Mental health is benefitted by employment, but the quality of work (16) and its structure (17) are also key considerations. There is substantial research evidence supporting links between exposure to work stressors that can catalyse job stress, and subsequently lead to deteriorations in physical and mental health (18). These

work stressors can include: i) the way work is organised, including processes of change; ii) job-related psychosocial risks (e.g. workload, schedules, support); iii) production methods (e.g. pay incentives schemes, the pace of work, processes); and iv) insecure work or unfair decision making (19).

Macro-level factors such economic globalization, political policies and labour market deregulation have had a major impact on business and employment strategies around the world (20). In turn these factors have led to major organisational changes (e.g. mergers, downsizing, cost reductions) that have effected a rise in precarious employment and underemployment (21). Other studies have shown that these types of employment conditions can lead to psychosocial hazards such as work intensification, inadequate rewards, loss of job control and job insecurity, which have in turn been linked with job stress and poor individual health outcomes (22). Employee deployment strategies, reward systems and performance management are psychosocial considerations, which can have greater adverse impacts on workers who are already socially disadvantaged (23).

Legislation coverage

When we examined the wording of legislation within the Tasmanian Workers Compensation and Rehabilitation Act 1988 we found that it excluded compensation claims for mental disease substantially caused by:

- “Reasonable action taken by an employer to transfer, demote, discipline, counsel or cease employing a worker;
- A decision of an employer based on reasonable grounds, not to award promotion or benefit in connection with a worker’s employment” (Section 25).

In examining this wording in other Australian states and territories, we found similar phrasing used to exclude claims based on these ‘reasonable’ management decisions. However, recent research on Australia’s new WHS legislation has suggested that employers and their representatives may be liable for management decisions previously considered ‘reasonable’ if they are hazardous to employee health (24). These hazards are not just physical; they are psychological as well.

There is now a wealth of evidence supporting deteriorations in employee mental health as a result of deployment or incentive-based decisions that seemed ‘reasonable’ to employers implementing neoliberal strategies for workforce management. We consider that workers compensation legislation should specifically include requirements for managers to proactively manage work processes to reduce negative impacts on the health and productivity of employees. Improved legislation would allow us to obtain more accurate perspectives on the incidence and prevalence of psychological illnesses and injuries, and of their contributing work factors. As managers collect information on their work practices, they will also be able to develop lead indicators of psychosocial hazards relevant to their operations, thus fulfilling their obligations under the WHS Act (25).

Psychosocial hazard identification

As was noted in the introduction, a key function of the NDS regulatory dataset is to identify causal factors contributing to injury and illness. At present, a standard classification scheme (ToOCs 3rd edition) is used in all Australian jurisdictions to code claims-based data, including causal mechanisms leading to illness and injury. The mechanism description for mental diseases includes two non-acute categories:

- i) work pressure, which is described as “mental stress arising from work backlogs, deadlines, responsibilities, organisational restructure...interpersonal conflict with peers, supervisors...performance counselling, job disciplinary action, job promotion disappointment” (p.163) and
- ii) workplace harassment and/ or bullying, which is defined as a “victim of repetitive assault and/or threatened assault or...repetitive verbal harassment, threats, and abuse from a work colleague or colleagues” (p.164) (26).

In examining this wording we noted two key issues. First, the ‘work pressure’ description seems quite arbitrary and is a large ‘catch-all’ category for most factors likely to be associated with occupational mental disease. For instance, research shows that work demands are not necessarily stress-inducing by

themselves; they often rise to prominence when a worker is inadequately resourced in the face of pressure (27) or where a worker is facing other (non-work) challenges that reduce coping ability (28). The above coding does not adequately describe the actual mechanisms contributing to job stress.

Our analysis of 4 years of data from the Tasmanian Government showed that nearly 65% of all claims clustered within this category each year. This general ‘catch-all’ category is not helpful for employers or policy-makers attempting to identify or address causal factors contributing to mental disease. Better categorization is already available. For instance, in 2013 Canada implemented a new national psychological health and safety standard that targets 13 workplace factors, namely organisational culture, leadership, civility, work supports, mental demands, career development, rewards, influence, workload, engagement, work-home balance, mental and physical protection (29). Arguably this is a relatively new initiative for employers in that country but the concept of targeting a range of risks for workplace stress is supported by evidence from the United Kingdom’s Health and Safety Executive Standards (30) which have aided reductions in that region’s workplace injury rates (31). In the Australian context, more detailed categorization of psychosocial factors that can be integrated into work operations and also captured through compensation data should enable the development of a set of ‘positive performance indicators’ (also called lead indicators) that can be benchmarked across organisations and industries (25).

Second, psychosocial hazards such as work pressure are not the only contributors to job stress. The way that work is organised to effect operational outcomes constitutes a separate pathway to mental disease (17). This distinction needs recognition in workplace strategies and the classification scheme and has been highlighted in previous research commentary on stress-related claims (11). Overall, the ToOCs appears outdated with respect to job stress research and as such does not accurately reflect the mechanisms contributing to occupational mental disease. Employers and insurers may already capture this information during their claims investigation processes but it is not making a necessary transition to be themed as either positive performance indicators or regulatory datasets.

Obligations under the Australian WHS Act

Notwithstanding our observed concerns about the limitations of workers compensation legislation, new WHS legislation in Australia applies minimum due-diligence obligations to duty-holders under section 27 (32). For example these obligations state that employers need to “acquire and keep up-to-date knowledge of work, health and safety matters” (section 27[5](a)) and “gain an understanding of the nature of the operations of the business or undertaking...and generally of the hazards and risks associated with those operations” (section 27[5](b)). As was noted earlier, these obligations mean that employers need to consider the work organisation and psychosocial factors that may contribute to the risk of mental as well as physical diseases.

Stress claim data would seem a natural starting point for identifying these factors and patterns and profiles across work settings. However, our analysis of these regulatory data for the Tasmanian Government workforce showed that it gave little information that enabled us to predict the features (e.g. mechanisms, descriptors) of stress claims (7). This outcome implied that regulatory data were likely to be of little assistance to the Tasmanian Government in developing strategies to ensure they are fulfilling their legal obligations. Where these datasets currently capture lag indicators, organisations need to be able to proactively address incidents, near misses and psychosocial risk trends.

Furthermore, it has been estimated that for every employee who submits a claim, there are 30 more who experience job-related depression (33). These factors infer that employers need to find alternative ways to monitor and evaluate job stressors affecting their workforces. Whilst an organisation-specific approach to the assessment and control of psychosocial risks to mental health is a best practice approach (29,34) it may increase administrative burdens for employers, particularly smaller businesses, and may also undermine the capacity to identify systemic hazards across industry sectors or occupational groups. Ideally, the NDS can provide a high level system of surveillance, complemented by organization-specific strategies that reflect an integrated approach to workplace mental health (35,36). Given the complex and interrelated set of factors influencing work and health, we believe that regulators, academics, industry

members and occupational health professionals have a role to assist employers in understanding and responding to job stressors.

Implications

For employers

Duty-holders need to resource mentally safe and healthy work and to achieve that, good quality information on causes, trends and outcomes of job stress are needed. Employers could be assisted by carefully investigating facts and circumstances of stress claims, and by identifying related work organisation or psychosocial hazards in order to prevent and reduce risks. Good management practices are a key factor in preventing job stress (37) and the development of managers' and leaders capabilities in relation to mental health has been recognized as critical (38,39) as has a multilevel approach to job stress prevention (employee, team and organisational level) (40). Employers can also proactively undertake surveillance of, and trends in mental ill-health in their workforce by including assessment of proactive strategies (awareness, resilience, management training) and these factors in internal surveys and other mechanisms for capturing sources of stress (41). The up-side of implementing these types of processes and data sets are that they should enable employers to present a case to compensation insurers for reducing premiums, which have typically been higher for stress claims because insurers have struggled to classify and discriminate risks (42).

For regulators

Nationally, the Australian Safety and Compensation Council could update the Type of Occurrence Classification Scheme for mental diseases so that it reflects modern job-stress hazard research. SafeWork Australia could then enhance data capture within the NDS for these extra categories.

At a state and territory level, regulators could

- i) develop low or no-cost tools for employers to investigate links between, and provide responses to, work-related stressors and stress claims,

- ii) revisit compensation legislation wording so that it reflects contemporary research on causal pathways between psychosocial working conditions and job stress,
- iii) continue to improve regulatory data collection and reporting systems on job stressors linked to compensation claims, and
- iv) introduce positive performance (lead) indicators for reporting that measure the effort and proactive approach to managing mental health and associated incidents.

Conclusions

While Australia has sophisticated workers compensation systems that permit claims for mental diseases, the way that regulatory data systems capture these data are out of date with research on job stress and are after the event. This gap disadvantages policy-makers, employers and researchers working with work-related disability. Although regulators can assist with updating of legislation and regulatory data capture systems, employers ultimately remain responsible for ensuring that they are fulfilling their obligations under the WHS Act in relation to mental as well as physical disease.

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Appendix E: Supplementary data

These tables and figures provide supplementary data to that reported in the thesis chapters.

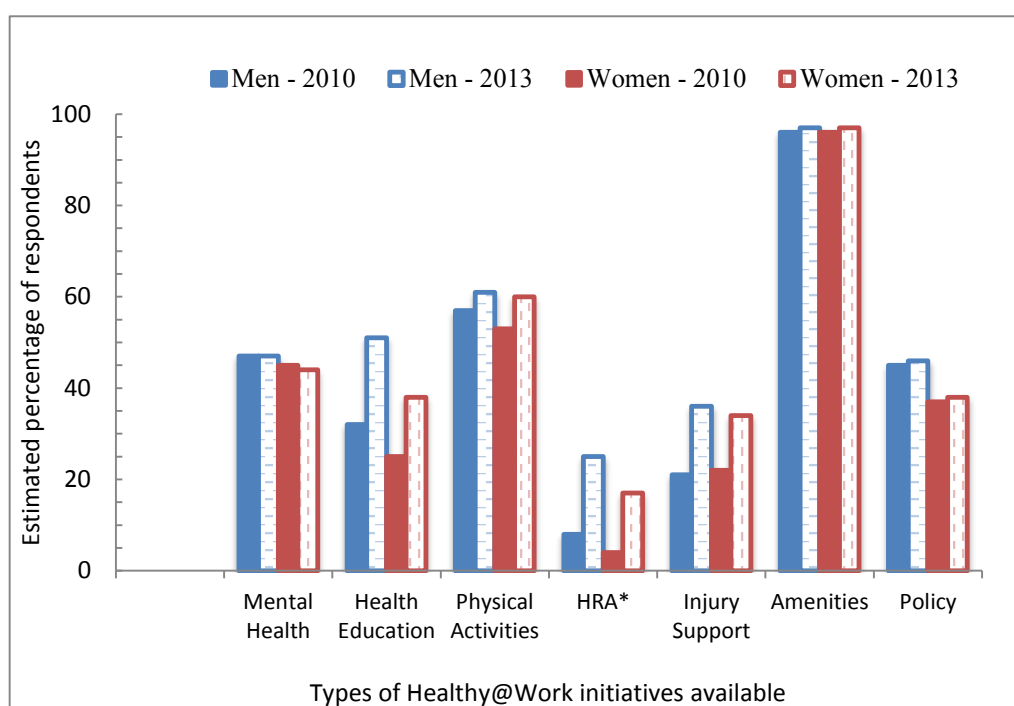


Figure E-1. Percentages of respondents reporting availability of Healthy@Work initiatives in 2010 and 2013.

*= Health Risk Assessments

Table E-1. Price indices applied to convert workers compensation claim payments to constant prices between 2007 and 2011.

WorkCover Tasmania payment code	Price index applied	Deflator percentage applied (reference year = 2010-11)			
		2007-08	2008-09	2009-10	2010-11
Medical Practitioner or Specialist Payment	AIHW: Medicare Medical services ¹	94.8	96.3	98.6	100
Hospital Expense	GFCE Hospital and nursing homes ¹	92.1	95.1	98.6	100
Weekly payments	ABS Wages Price Index ²	87.3	91.8	97.2	100
Other Treatment or appliance payment	GDP ¹	88.8	93.3	94.2	100
Vocational rehabilitation	GDP	88.8	93.3	94.2	100
Allied health payment	Other health practitioners ¹	90.6	94.4	96.9	100
Insurer legal expense	GDP	88.8	93.3	94.2	100
Investigation expenses	GDP	88.8	93.3	94.2	100
Miscellaneous	GDP	88.8	93.3	94.2	100

Source documents:

1. Australian Institute of Health and Welfare 2012. Health Expenditure Australia 2010-2011. Health and Welfare Expenditure series no.47. Cat No HWE56. Canberra: AIHW (Appendix tables C1 and C2).

2. Australian Bureau of Statistics 2013. All WPI series: Original financial yr. Index numbers for year ended June quarter series: "ordinary time hourly rates of pay excluding bonuses: Australia: Public; All industries; ABS.gov.au/austats.abs@nsf/mf/6345.0; accessed 10 September 2013.

Notes:

- The WorkCover Tasmania expense named 'Other treatment' includes definitions encompassing prescriptions, equipment and home help, which when examined under the AIHW index cover items that have inflated and deflated. GDP was chosen as an intermediate solution to these variations
- Other expenses couldn't be accurately matched to the AIHW indices so GDP was used as a proxy for constant price.

Table E-2. Log binomial regression models of demographic variables associated with stress-related compensation claims for men and women in the Tasmanian State Service during the period 1 July 2007 to 30 June 2011

<i>Variables</i>	Men			Women		
	PR	95% CI	<i>p</i>	PR	95% CI	<i>p</i>
Age (years)						
16-24	1.00	-	-	1.00	-	-
25-34	1.25	0.45 – 3.44	0.667	2.76	1.11 – 6.84	0.029
35-44	1.49	0.56 – 3.95	0.423	3.38	1.39 – 8.19	0.007
45-54	1.97	0.75 – 5.16	0.168	4.59	1.90 – 11.0	0.001
55+	1.61	0.60 – 4.30	0.345	4.12	1.69 – 9.98	0.002
Occupation						
Blue Collar	0.27	0.17 – 0.41	<.001	0.33	0.22 – 0.49	<.001
Admin	0.30	0.20 – 0.44	<.001	0.68	0.54 – 1.01	0.058
Service	1.00	-	-	1.00	-	-
Professional	0.75	0.47 – 1.22	0.248	1.04	0.75 – 1.52	0.717
Manager	1.14	0.66 – 1.97	0.634	1.15	0.71 – 1.81	0.594
ROC	0.6738			0.6046		

¹ PR, Prevalence Ratio; CI, Confidence Interval; ROC, Receiver Operating Characteristic Curve.

- Models for men and women were calculated separately.

- Reference categories: 16-24 years; Service Occupation.

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Table E-3. Comparisons of respondents and non-respondents for Partnering Healthy@Work surveys in 2010 and 2013 by age, tenure, employment condition and employment category, stratified by sex

	Respondents	Non-respondents	Test statistic (df)	p-value
2010	Men (n=4053)			
n	947	3106		
Mean age (SD)	46.99 (0.34)	44.37 (0.19)	t(4051)=-6.6	<0.001
Mean tenure (years (SD))	14.18 (0.38)	12.37 (0.20)	t(4051)=-4.4	<0.001
% full-time	84.69	83.77	chi2(1)=0.5	0.500
% permanent	88.38	85.64	chi2(1)=4.6	0.030
2013	Men (n=3865)			
n	917	2948		
Mean age (SD)	47.64 (0.34)	44.87 (0.21)	t(3863)=-6.7	<0.001
Mean tenure (years (SD))	14.90 (0.39)	12.25 (0.20)	t(3863)=-6.5	<0.001
% full-time	84.30	79.85	chi2(1)=8.9	0.003
% permanent	85.71	84.46	chi2(1)=0.8	0.360
2010	Women (n=8126)			
n	2422	5704		
Mean age (SD)	45.84 (0.21)	44.36 (0.14)	t(8124)=-5.7	<0.001
Mean tenure (years (SD))	12.72 (0.21)	11.41 (0.13)	t(8124)=-5.4	<0.001
% full-time	50.87	48.28	chi2(1)=4.5	0.030
% permanent	92.53	89.46	chi2(1)=18.3	<0.001
2013	Women (n=8142)			
n	2311	5831		
Mean age (SD)	46.80 (0.21)	44.80 (0.15)	t(8140)=-7.3	<0.001
Mean service length (years (SD))	13.03 (0.21)	11.98 (0.13)	t(8140)=-4.2	<0.001
% full-time	47.81	43.32	chi2(1)=13.5	<0.001
% permanent	88.01	85.10	chi2(1)=11.6	0.001

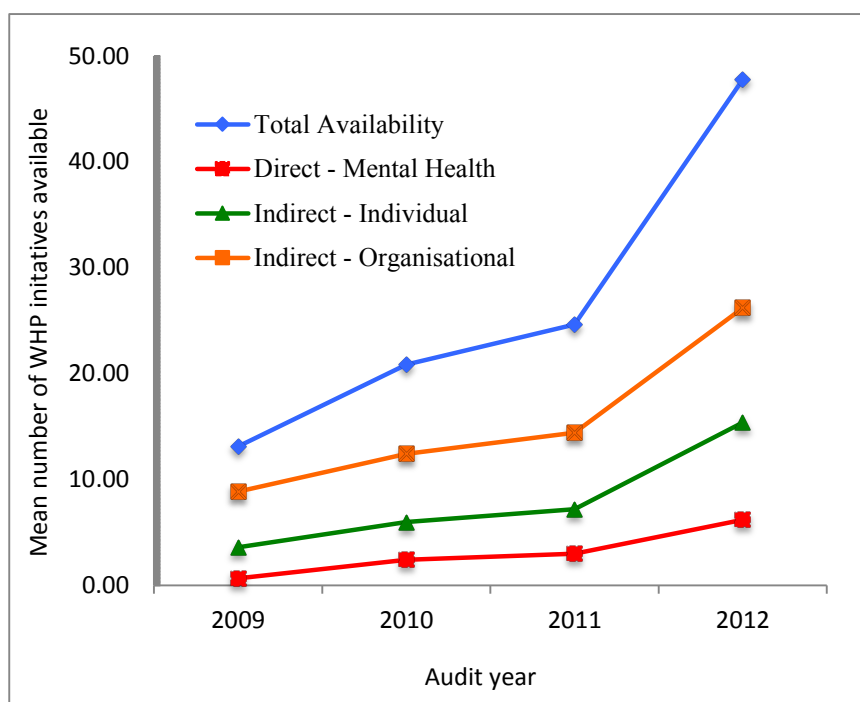


Figure E-2. Mean numbers of available Workplace Health Promotion initiatives per department reported through Tasmanian Government audits between 2009 and 2012.

Appendix F: Tasmanian Population Health Survey comparisons 2009 and 2013

Table F-1. Mean Kessler-10 scores by sex for Tasmanians aged 18 years and over who were employed for wages in 2009 and 2013.

	2009		2013		<i>p</i>
	K10 score ¹ (mean)	95% CI	K10 score (mean)	95% CI	
Men	14.3	14.0 – 14.6	14.2	13.8 – 14.5	0.674
Women	15.2	14.9 – 15.6	14.7	14.4 – 15.1	0.522

¹ Kessler-10 survey score, weighted to the Tasmanian working population. Source: Tasmanian Population Health Surveys 2009 and 2013.

Appendix G: InTouch publication

This article appeared in InTouch, newsletter publication of the Australian Public Health Association Incorporated, September/October 2012.



Mental Health in the Workplace: Partnerships in practice

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With a pressing need to reduce chronic disease, workplaces are increasingly being seen as settings with opportunities for health promotion. The Tasmanian State Service is one of this State's largest employers, with a geographically and occupationally diverse workforce of approximately 30,000 people. Since 2008 it has been implementing the Healthy@Work initiative, a health promotion program that focuses on organisational change and aims to promote and improve mental and physical health (www.healthyatwork.tas.gov.au).

The pH@W research partnership commenced in 2009 supported by a 5 year National Medical Health and Research Council (NHMRC) partnership grant. Partnering Healthy@Work brings together multidisciplinary researchers from the Menzies Research Institute Tasmania and the University of Tasmania and leading practitioners from within the Tasmanian State Service to address complex questions about the feasibility, effectiveness and sustainability of the Healthy@Work initiative (www.menzies.utas.edu.au/healthyatwork).

A key initiative of pH@W is professional development through regular seminars and workshops. In early February this year, 132 practitioners, students, researchers and policy makers gathered in Hobart to hear leading national experts present their thoughts, experience and up-to-date research findings on key challenges and potential interventions in the field of mental health in the workplace from today through to 2030. Keynote presentations addressed psychosocial safety climate (Professor Maureen Dollard, University of South Australia), work and family (A/Professor Lyndall Strazdins, Australian National University), intervention design and implementation (A/Professor Anthony La Montagne, University of Melbourne), and policy (Christina Bolger, Director Work Health Comcare).

Creating a healthy workplace can present major challenges and can be perceived by employers as an expensive and unsustainable venture in the face of changing organisational priorities and budget pressures. But employers are not alone in having a role to play – partnerships are essential. A key emergent theme was the need for academic, government and business communities to work together to develop integrated interventions that cover the areas of prevention, protection and reaction.

These issues were explored in a lively interactive panel session at the end of the day. In response to our question how can mental health in the workplace be improved by 2030? the following critical short, medium and long-term actions were identified.

In the next 12 months the Panel recommended a focus on: developing better mental health measures; gathering research information to build education materials; encouraging collaboration between occupational health and safety regulators; making government-sponsored, low-cost interventions available to employers; and holding debates to develop best-practice principles in response to mental health challenges.

In the next 5 years the Panel felt it was important to: consistently measure mental health climate; provide management education on how to develop and implement mentally healthy environments; implement legislation that includes a focus on mental health in occupational health and safety; develop suitable government policy on compliance; and develop and promote protocols on respectful workplace behaviour.

The Panel's vision of 2030 was a work environment where stigmatising and toxic workplaces were a thing of the past. They envisaged comprehensive regulation of health at work and consumer awareness of responsible business practices. Integration was also a key feature of 2030, with mental health promotion embedded into business practices and compensation schemes merging work and personal claims processes.

Two years into the project pH@W has established a model of research-government partnership that benefits from joint governance, researcher-policy exchange placements, and a monthly seminar series addressing a current issue from a researcher and practitioner's perspective. Over the next few years we will evaluate whether this partnership has produced research that is more policy-useful and policy implications that are more evidence-based.

Our next workshop will be held early in 2013 and will focus on critical economic aspects of workplace health promotion.